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**Research environments:** Biological and Environmental Systems (BLESS), Center of research on Welfare, Health and Sport (CVHI) and Halmstad Embedded and Intelligent Systems Research (EIS)

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Project started 2008.

**Title:** Understanding Performance and Injury Risk for On-water Board Sports

### Abstract

The interaction of the task, environment and the athlete are essential for the performance of on-water board sports. This project have so far presented studies and a system analysis with the aim of increasing the general understanding of the interaction between factors influencing performance and injury risk of kitesurfing. The studies report on injuries related to kitesurfing, sport performance, self-reported musculoskeletal stress, pain and discomfort, and usability issues related to the equipment. The methods used for these studies have mainly been based on subjective measures (hierarchical task analysis, observations, questionnaires, interviews and focus group). For further analysis of the research area, objective measures are of interest to reveal more detailed information about biomechanical variables.

The results have shown that most injuries reported are related to the tasks jumps and tricks and located in the knee or foot. Musculoskeletal stress is perceived as high in the abdominal region, thighs and lower back. Knees and feet are areas reported subjected to pain or discomfort, together with the lower back. The equipment and environmental factors can contribute to injuries and discomfort while kitesurfing, and there are usability issues related to the management of kitesurfing equipment. The information provided can serve as a basis for development of training methods and equipment for comfortable and safe performance.

**Keywords:** sport performance, sport injury, musculoskeletal stress, system analysis, usability problems, human movement

### Publications:

Licentiate thesis

Lundgren, L. (2011) System Analysis of Kitesurfing: Understanding Performance and Injury Risk for On-water Board Sports. Chalmers University of Technology, Göteborg.

### Peer-reviewed articles

Lundgren, L., S. Brorsson, Hilliges M., Osvalder A-L. (2011). "Sport performance and perceived musculoskeletal stress, pain and discomfort in kitesurfing." *International Journal of Performance Analysis in Sport*, 11: 142-158.

### Peer-reviewed conference papers

Lundgren, L., S. Brorsson, Osvalder A-L. (2011). "Injuries related to kitesurfing." Accepted for: ICSMSS 2011: International Conference on Sport Medicine and Sport Science, Paris.

Lundgren, L., Bligård, L-O., Brorsson S., Osvalder A-L. (2011). "Implementation of usability analysis to detect problems in the management of kitesurfing equipment." Accepted for: Procedia Engineering, APCST 5th Asia-Pacific Congress on Sports Technology. Melbourne.

**Peer-reviewed conference abstracts**

Lundgren L., Brorsson S., Observational analysis of body position while kitesurfing, Conf. abstract., oral presentation. Sport Kinetics, Greece, Sept 2009.

Lundgren L., Brorsson S., Hilliges M., Osvalder A-L. Pilot study: Injuries and body stress within kitesurfing, Poster presentation, Nordic conference on Health, Participation and Effects in Sport and Exercise, Halmstad, Oct 2008.

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