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SAFETY IN SPORTS: CHALLENGES AND OPPORTUNITIES

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ABSTRACT

The positive role of sports and physical activity to maintain health and well-being is not questioned. On the other hand we have to register a significant number of acute and also long-termed injuries which are related to practising sport. A good estimate for European countries is an injury rate of approximately 500 per 10.000 which would accumulate to 3,28 million sports related injuries in the UK.

Under the leadership of two well-known institutes, Oslo Sports Trauma Research Centre and the Research Centre for Physical Activity, VU Medical Centre, Amsterdam, the European College of Sports Science has published a consensus paper on the prevention of acute sport injuries. This research group sees the use of equipment designed to reduce injury risk at first position of the most successful prevention measures.

For this reason one major concern of our research is to improve protective equipment or even to develop new concepts. Further we also look at functionality and performance of sporting goods, because this is often also linked to safe operation. From a methodological standpoint, investigations in this field may become rather difficult because for ethical reasons experiments with subjects have to be ruled out. Instead we sometimes have to use mechanical (physical) and mathematical models to simulate the behaviour of (protective) equipment in safety critical situations.

Keywords: safety in sports, footwear, sports injuries, protective equipment.

RESULTS AND CONCLUSION

The keynote presentation will give three examples of our research:

(i) The first in the field of footwear design applied to soccer and trail running, Figure 1;

(ii) The second example illustrates the protection capacity of sport helmets, Figure 2;

(iii) The third deals with opportunity of and the challenge to develop mechatronic ski bindings in order to reduce the number of knee injuries, Figure 3.

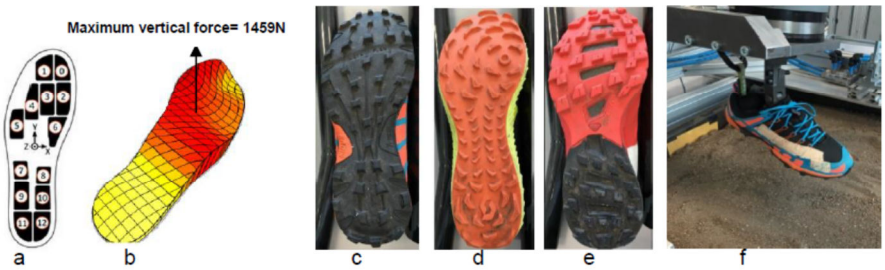

Fig. 1 - Comparison and evaluation of shoe-surface interaction factors in subjective and objective measurements

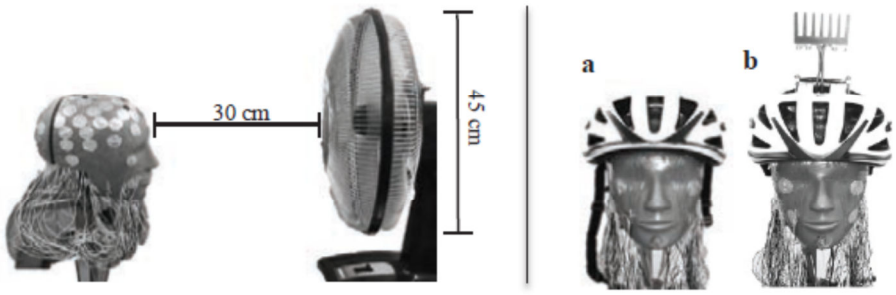

Fig. 2 - Experimental setup with thermal head model and fan

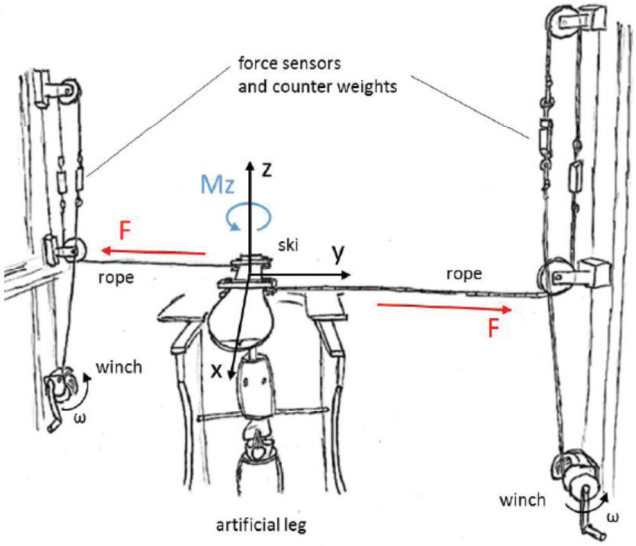

Fig. 3 - Artificial Knee Joint and Ski Load Simulator. Principle of the load application of the test rig.

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