

Optimizing Performance and Evaluating Recovery from Exercise

As innovative fabric technology becomes more sophisticated, many active sportswear manufacturers have come to rely on scientific research that blends biomechanical engineering and kinesiology into technical textile product development. Through its Human Performance Laboratory (HPL), the University of Calgary is one of the top colleges in North America focusing on these areas.

Jay Worobets, Ph.D. and Post-doctoral fellow at the University of Calgary, explains, "The goal of the HPL is to be a leader in researching related musculo-skeletal questions."

The various disciplines represented in the HPL include biochemistry, biology, biomechanics, exercise physiology, medicine and neuro-motor control. The close co-operation among these groups is one of the special characteristics of the musculo-skeletal research being conducted at the University of Calgary.

Jump Higher, Run Faster

Research at HPL is broad-based. Studies range from addressing specific issues, like researching the potential maximum performance of muscle cells to produce a force that will cause an elite athlete to jump higher;



In Motion: Researchers put elite athletes through their paces during testing at the Human Performance Lab.

optimizing the traction by one percent of sprint spikes in athletic shoes in order to increase the performance of sprinters at the upcoming London Olympic Games; and focusing on issues that affect the general population, like what kind of footwear should elderly people wear to promote a healthy gait.

According to Dr. Worobets, HPL's research extends into functional sport equipment,

including athletic apparel, with the goal of fine-tuning its properties for specific athletic characteristics. This procedure maximizes the athletes' performance and minimizes the risk of injury.

The Human Performance Laboratory is staffed by a group of faculty professors from the fields of kinesiology, engineering, and biomedical engineering. In addition, graduate students, a research technician, and undergraduate students are also involved to assist with the projects.

Worobets notes, "Each person in our group works both on pure academic research, as well as on research projects for specific industry partners, such as Adidas and Taylor Made Golf. The students that join our group typically have backgrounds in kinesiology or engineering, with strong foundations in physics and/or mechanics. And, some of the graduating biomechanics researchers from our Lab have gone on to join the R&D departments as senior product development researchers at major sport companies like Adidas, Nike, and Oakley (China)."

Performance Projects for Athletic Shoes and Apparel

Worobets highlights two current research projects being conducted at HPL that involve the textile industry: 1) Understanding how footwear traction affects performance and injury; and 2) Understanding how athletic apparel can affect performance and recovery after exercise.

In the footwear traction project, Worobets says that the research staff hopes to "gain insight into how athletic footwear outsoles should be designed, in order to provide enough traction for an athlete to move as fast as possible, yet not having too much traction that ankle or knee joints can become injured because the shoe was too firmly engaged with the surface."

Evaluating the performance and post-exercise recovery of athletic apparel, Worobets explains, "Athletic apparel can be used to apply compression to muscle packages, provide increased elastic stiffness to a joint, increase or decrease an athlete's skin and/or core temperature, and even alter the amount of oxygenation of a muscle package. Each of these aspects can affect athletic performance. Our research is aimed at understanding exactly how these effects occur, and ultimately provide the information necessary to design functional athletic apparel that will enhance performance and recovery from exercise." ●

For more information on the University of Calgary's Human Performance Laboratory, contact Dr. Jay Worobets, Worobets@kin.ucalgary.ca, or (403) 220-2704.

Kathlyn Swantko, president of the FabricLink Network, created TheTechnicalCenter.com for industry networking and marketing of specialty textiles, and FabricLink.com for consumer education about everything fabric.

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