



RESEARCH MEETING PRACTICE TO
PREVENT
MUSCULOSKELETAL DISORDERS



Centre of Research
Expertise for the
Prevention of
Musculoskeletal Disorders



A safety partnership



A message from George Gritziotis, Chief Prevention Officer and Associate Deputy Minister Ontario Ministry of Labour

While MSDs aren't exactly fodder for the writers of tomorrow's headlines, perhaps they should be.

After all, injuries to the muscles, tendons, ligaments and nerves that develop from ergonomic risk factors such as repetitive, forceful or awkward movements — musculoskeletal disorders — are almost always preventable.

But if they're preventable, why do MSDs continue to account for more than 40 per cent of all lost time workplace injuries in Ontario? This situation must not continue, and I have every confidence that it won't.

Although the personal and financial burdens of work-related MSDs are incalculable, they are becoming increasingly avoidable thanks in large measure to the multi-faceted approach of organizations such as the Centre of Research Expertise for the Prevention of Musculoskeletal Disorders (CRE-MSD), hosted by the University of Waterloo.

In April 2012, the Ministry of Labour acquired the mandate to help improve the prevention of work-related injuries and illnesses. In my new role as Chief Prevention Officer, I regard the work of CRE-MSD as essential to the revitalization of Ontario's ongoing quest for workplaces that are safer and healthier.

The Centre's impressive endeavours span the field of MSD prevention research from intensive, laboratory-based studies into cell and tissue disorders to the creation, implementation and evaluation of prevention programs. I am certain that the Centre's findings will continue to inform valuable improvements to health and safety in our everyday world of work.

As Ontario develops its first system-wide integrated occupational health and safety strategy, I look forward to working with CRE-MSD in contributing to the establishment of clear priorities that will guide the occupational health and safety community (system partners, labour and businesses, education and training, private trainers) in the years ahead.

George Gritziotis
Chief Prevention Officer, Associate Deputy Minister of Labour

About The Centre of Research Expertise for the Prevention of Musculoskeletal Disorders (CRE-MSD)

The Centre of Research Expertise for the Prevention of Musculoskeletal Disorders (CRE-MSD) was founded in 2004 to improve the understanding and prevention of musculoskeletal disorders. CRE-MSD is led by Dr. Richard Wells, the Director, and Dr. Jack Callaghan, the Associate Director of Research, who are committed to engaging a network of dedicated researchers across thirteen research institutions, partners and collaborators to initiate activities that address the challenges of preventing MSDs.

Together with our workplace partners, our vision is to identify the key questions, find the best research answers, and pass on the best knowledge that will lead to the prevention of MSDs at work. Our commitment to workplace intervention research, to involving workplace parties in the identification and execution of research, and to creating a diverse network of researchers across Ontario will make sure that there is a place for this interest to be nurtured.

Our commitment to MSD prevention research and our reputation in the research community has built strong collaborative ties with other research centres locally and across Canada. Our researchers contribute to the scientific direction of the Centre and our strategy continues to encourage established researchers, young faculty and students to engage with partners.

CRE-MSD is firmly committed to its research to practice initiatives that highlight our commitment and dedication to stakeholder involvement and knowledge transfer. This strategy emphasizes the value added proposition that underpins the Centre's activities:

“RESEARCH MEETING PRACTICE TO PREVENT MUSCULOSKELETAL DISORDERS”

“The Centre highlights important issues in the prevention of MSDs by hosting conferences and workshops. The Centre is now a meeting point where different views can be expressed, and even ‘puzzlement’ can be discussed. We raise awareness on issues that need attention. We sponsor ‘conversations’ on these issues, and then profile, explore and examine these issues on our website.”

Dr. Richard Wells
CRE-MSD Director



Creating the Practitioners and Researchers of Tomorrow



Tyson Beach has recently become an Assistant Professor in the Faculty of Kinesiology and Physical Education at the University of Toronto, where he also holds an appointment in the Graduate Department of Exercise Sciences. An overarching aim of his research program is to devise tools and techniques to enhance and maintain the capacity of the musculoskeletal system to withstand physical demands of work and sport.

Tyson's doctoral thesis was completed under the supervision of Dr. Jack Callaghan in the Department of Kinesiology at the University of Waterloo. Together with Drs. Stuart McGill and David Frost, they were awarded seed grants from CRE MSD to tackle the "strains and sprains" problem in the fire service.

Using state of the art, biologically inspired measurement tools, techniques, and analyses, Drs. Tyson Beach, David Frost, Stuart McGill and Jack Callaghan uncovered characteristics of firefighters themselves that can increase their risk of sustaining avoidable injuries. Funding provided by CRE MSD allowed these researchers to reveal mechanisms that explain relationships between musculoskeletal loading demands, capacity, physical fitness level, previous injury, and body awareness, coordination and control. Fire departments across North America have taken notice, and the research findings are being used directly to re-develop the *Peer Fitness Trainer Education and Certification Programs* that were created jointly by the *International Association of Fire Fighters*, *International Association of Fire Chiefs*, and the *American Council of Exercise*.

At the University of Toronto, Tyson and his graduate students are building on this research, again with the support of CRE MSD. The seed grant program not only provides a mechanism to connect researchers with stakeholders to address the burden of musculoskeletal disorders in the workplace, but the support offered by CRE MSD helps to establish new research programs and opportunities for training students; the practitioners and researchers of tomorrow.

Read the full story

*For more information about this or other research,
please visit www.cre-msd.uwaterloo.ca*



Engaging our Stakeholders in Research

Interaction with stakeholders is a key goal for CRE MSD. Much of the Centre's research includes stakeholders who help define the research questions and are actively involved throughout the study. CRE MSD recently funded a study to look at the discomfort suffered by police officers in their cruisers. Officers spend an average of four hours in a 12 hour shift engaged in computer and data entry in their police cruisers. Due to the restriction of space, their laptop computers are mounted to the side. This requires twisted and awkward body positions during computer work. Drs. Jack Callaghan and Clark Dickerson, and graduate student Colin McKinnon from CRE MSD, were invited by an Ontario Health and Safety Association partner to help them address reports of pain and discomfort by officers. The Regional Police Services from Windsor, Waterloo, and York enthusiastically joined the project. A CRE MSD seed grant allowed a rapid response to the stakeholders' concerns. A laboratory simulation of driving a police cruiser and interacting with a laptop showed that moving the laptop around within the constraints of current cruiser interiors was not helpful. This indicated that alternate technologies and interface approaches were required to address the MSDs associated with the job demands.

In order to address the seating problem, a car seat specially developed for a police cruiser has been tested. The prototype seat included an active lumbar support that periodically changes shape, a shortened seat pan and structural modifications to provide active torso support and accommodate the police duty belt. It was found that the new seat reduced discomfort in the low back compared to the standard seat during both simulated driving and actual cruiser operation.

This project exemplifies how CRE MSD researchers are responding to the needs of stakeholders.

Read the full story

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Getting it Right the First Time: Technology Design in Mining

The mining industry has come a long way since blind pit ponies pulled wheeled carts filled with coal from the depths of the earth. Mining is now very sophisticated with machinery to drill, grind, crush, blast and transport ore up to the surface. However, operators of mobile mining equipment (such as load haul dump vehicles) are still at risk for musculoskeletal disorders stemming from poor postures adopted to compensate for impaired sightlines. Drivers cannot see where they are going because of any number of obstacles including wheel well covers, buckets, light posts, booms, radio remote boxes, elevated engine profiles and air intake cylinders. In order to avoid obstacles, operators have to rotate, flex, stretch and bend their bodies in very awkward positions, all leading to an increased risk for musculoskeletal disorders.

In 2008 CRE MSD funded a study to quantify and identify these musculoskeletal hazards. The study, led by Dr. Tammy Eger from Laurentian University, with co researchers from Laurentian, the University of Waterloo and Queen's University identified LHD design features associated with poor line of sight and discussed the close link between line of sight and posture. The study used multiple methods including eye tracking, digital video cameras and a seat pressure measurement system to model line of sight from the operator's position in the vehicle. The study also recommended the installation of cameras to enable the LHD operator to "see" blindspots. In 2012 CRE MSD funded Dr. Alison Godwin and colleagues at Laurentian University to evaluate the impact of placing camera monitors inside the LHD cab. Dr. Godwin and colleagues, along with industry partners (Winsted Group and PROVIX cameras) and the Ontario mining industry are currently evaluating the benefits of a four camera system to improve line of sight and the ideal placement of camera monitor(s) in cabs to minimize MSD risk. Several LHD vehicles have already been retrofitted and anecdotal feedback from the LHD operators has been very positive.

Read the full story

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Updates from Research: Reducing Fatigue and Preventing MSDs in the Workplace

We've all felt fatigue at one time or another – perhaps as the result of strenuous activity or immense concentration, or as a symptom of illness or simply from staying up too late. Fatigue is complex, and perhaps as a result of this complexity, surprisingly little is known about muscle fatigue in modern production processes.

Researchers from CRE MSD led by Dr. Richard Wells, the Centre's Director, partnered with AUTO21, a member of the Canadian Networks of Centres of Excellence, to measure and reduce one type of workplace fatigue: neuro-muscular fatigue. This research and other similar efforts to understand and reduce fatigue to prevent MSDs in the workplace were presented at a conference hosted by CRE MSD in December 2012.

The conference highlighted the latest research in MSD prevention. It included presentations from international researchers on topics including: Designing Jobs in Manufacturing; Preventing Fatigue During Repetitive Tasks; Fatigue During Prolonged Sitting and Standing; Relationships between Physical and Mental Fatigue and Task Performance, and; Healthy Office Work: Rest Breaks and Movement.

Response to the conference was overwhelmingly positive in terms of the content, relevance and usefulness. Comments from participants demonstrated an appreciation for the work of CRE MSD in making research findings useful and practical in a real world setting and how the Centre transfers knowledge to the Health and Safety System, workers and workplaces.

Read the full story

*For more information about this or other research,
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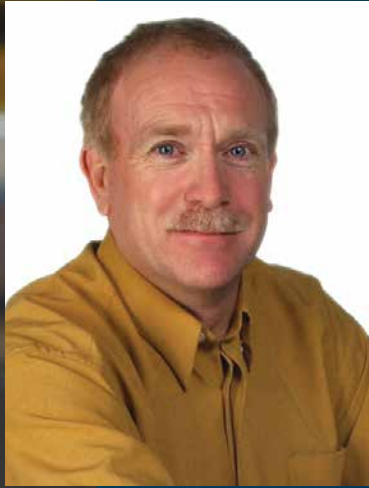


“The collaboration with the Centre and its partners has offered us the opportunity to create stronger links to researchers and other stakeholders interested in reducing MSD related risks and their associated injuries to workers. MSD injuries account for the greatest number of injuries experienced by workers in the sectors we serve - construction, electrical and utility, and transportation. CRE-MSD’s strength in research protocol and experience in workplace evaluations certainly augment IHSA’s problem identification and workplace application expertise. Further, CRE-MSD brings knowledge and skill to investigate the psychosocial issues involved in adoption (and rejection) of risk mitigating efforts, processes, products or programs – aspects that bring greater depth to the research and the solutions developed from it. We strongly support CRE-MSD in complementing and bolstering our ability to bring research solutions to our sectors.”

Enzo Garritano
Vice President, Research, Education and Specialty Consulting, Infrastructure Health & Safety Association

“The ability to translate research findings into real workplace applications enables WSPS to improve outcomes for the organizations it serves. Working with the Centre allows us to influence the research agenda, and leverage expertise and partnerships with researchers and workplace parties in identifying the issues that truly matter. Our collaboration has led to the development of highly relevant and effective products and services that are used in workplaces to reduce musculoskeletal injuries”

Barb Burns
Vice President, Organizational Excellence and Development, Workplace Safety & Prevention Services



Dr. Richard Wells is the Director of CRE MSD and a Professor in the Department of Kinesiology at the University of Waterloo. For the last two decades his main research and teaching interests have been work related MSDs of the upper extremity and low back in industrial and office settings. His research includes approaches to document exposure at work to assess work relatedness and the development of workplace processes and changes to prevent MSDs and monitor their health effects. He has been involved in ergonomics standards and regulations with ACGIH and OSHA in the USA and in the Ontario Strategy for the Prevention of MSDs and CSA. Richard is an Adjunct Scientist at the Institute for Work and Health and is also a consultant and speaker on ergonomic issues.

Dr. Richard Wells



Dr. Jack Callaghan is a Professor in the Department of Kinesiology at the University of Waterloo. He is CRE MSD's Associate Director, Research and holds the Canada Research Chair in Spine Biomechanics and Injury Prevention. He completed his undergraduate education at the University of Ottawa and his Masters and Doctorate degrees at the University of Waterloo where he specialized in spinal biomechanics. His main research interest is injury mechanisms from exposure to cumulative loading including the development of low back pain from sedentary and prolonged workplace exposures. This knowledge will complement existing epidemiological data, linking cumulative loading and low back pain, for setting exposure limits and helping to prevent low back injuries.

Dr. Jack P. Callaghan



“Being Director of CRE-MSD has given me the opportunity to bring researchers and workplace parties together to talk about the complex problems around MSD prevention, to support students and new researchers to pursue research into MSDs, to encourage researchers from many disciplines to work together on these problems, and to draw our stakeholders into the research process. Research that will lead to the reduction of risks for MSDs is not easy, but by engaging multiple partners in this endeavour, we will be able to tackle the complex problems of MSD prevention, and reduce the burden of pain that affects so many workers.”

Dr. Richard Wells
CRE MSD Director

“Our organization’s experience with CRE-MSD and its researchers was a positive, beneficial working partnership. We were able to share our industry insight and expertise, while the CRE-MSD team provided the benefit of their broader experience and knowledge, resulting in real life solutions tailored to reducing the risk of an MSD injury for our industry workforce. The knowledge we gained was shared with our employees, both during the study, as many of the employees were actively involved in the study, and since that time, in the form of training. The findings provided us with an awareness of how to carry out our workplace responsibilities more safely by adopting approaches that erred on the side of caution where there was risk of exposure to MSD injury. The greatest benefit of this study was that we were also able to take away the knowledge and ongoing proactive approach to real life situations we are faced with in our industry.”

Sylvia Rhodes
President, L. Ritchie Cartage Limited

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