

Guest Editorial

Canadian Researchers at WORK: Celebrating the Career of Dr. Joan Stevenson

As a PhD student at the University of Waterloo from 1992–1996, I had the very good fortune of working with and being mentored by Drs. Robert Norman and Richard Wells, two leaders in occupational biomechanics and ergonomics research in Canada. I worked, together with a number of other students and staff, including Patrick Neumann (Ryerson University, Toronto, ON), and Mickey Kerr (Western University, London, ON), on a large epidemiological study on low back pain in autoworkers (The Ontario Universities Back Pain Study). I learned a considerable amount through my participation on this project and developed a deep appreciation for how much high quality ergonomics and biomechanics research is conducted in Canada. It was during this time that I began to learn about Dr. Joan Stevenson and the excellent basic and applied research that she and her colleagues at Queen's University (Kingston, ON) were conducting. Her work on occupational low back pain and the development and evaluation of load carriage systems was advancing the discipline and students at all levels wanted to be involved in it. It was not until after my PhD was completed though, that I really got to know Joan and see firsthand the impact she was having on the field, her co-workers and students.

In the fall of 1996, I began a contract position at Queen's, teaching two courses and conducting some load carriage research with her working group. In the first course that I ever taught, a graduate course in Physical Ergonomics, I met Wayne Albert, Jon Doan and Tammy Eger, three very talented and keen researchers who were Joan's graduate students at the time, and who were all driving forces behind this special issue. For many reasons, it was a memorable time for me. Most of all, I remember being so grateful for the opportunity that Joan provided when there were not many jobs available, and how understanding and sup-

portive she was when I decided that I could not accept her kind offer of extending the contract over the summer of 1997, following a car accident I experienced during my long daily commute.

Since that time, Joan has continued to produce very high quality and innovative work, and key faculty members now working in the field today at universities throughout Canada. It is for this reason, and many others, that I agreed right away to look into the possibility of putting a special issue together to highlight Joan's influential career, when Jon Doan first contacted me, Tammy and Wayne with the idea. Many thanks to Karen Jacobs, the Editor-in-Chief of the journal *WORK*, and her assistants Victoria Hall and Briana Toegemann, for enthusiastically supporting me during the process of putting this special issue together. I would also like to extend personal thanks to all the authors who, without a moment's hesitation, submitted their work for inclusion in this special issue; work that I know Joan will be sincerely interested in and very proud to read.

The intent of this special issue of *WORK* was simple: to highlight the impact that Joan has had on Canadian researchers interested in occupational/work-related issues. We aimed to do this by showcasing the breadth and depth of the research that she has had a hand in creating via her roles as teacher, colleague and mentor. All of the authors of the papers included in this issue have been significantly influenced by Joan, and would not have been able to contribute this work without her involvement, at some point in their careers.

Taken together, the research presented herein comprises a broad array of interesting topics, both applied and basic in nature, which is paralleled by the diversity of the authors' backgrounds and interests. The issue opens with a review of Joan's primary research contributions over the years, by colleagues at Queen's

University, Patrick Costigan, Evelyn Morin and Susan Reid. As outlined in the paper, the common goal of all of Joan's research has been to prevent harm to workers. She has accomplished this in three main ways, by: developing bona fide occupational standards, with particular attention given to the importance of tailoring standards to specific user groups, including women; advancing our understanding of the multi-factorial nature of low back pain associated with industrial manual material handling tasks, and; establishing enhanced and objective design processes for functional load-bearing clothing and equipment. Joan's success in all three areas is punctuated by the development and evaluation of innovative, objective assessment methods and equipment; a fact which is reflected in the practices of all who have worked with her and learned from her over the years. For example, within the articles presented in this special issue, a range of methods are utilized, including various motion capture technologies, accelerometers, pressure sensors, and electromyography. Subjective ratings were collected by several authors that reflect the perceptions of the study participants, against which more objective measures were compared.

Joan's first PhD student, Wayne Albert, and colleagues utilized a mixed methods approach to understand the sitting posture, muscle activation and subjective ratings of stress experienced by bus drivers during normal work shifts in urban New Brunswick. This study reports that non-neutral postures of the neck and shoulders and significant postural adjustments occurred while driving over a one hour period, in addition to increases in muscle activation levels. Such changes have previously been shown to increase the risk of musculoskeletal disorders and the reporting of pain/discomfort in various workplaces.

Vibration has also been shown to be an important risk factor for the development and aggravation of musculoskeletal disorders of the upper extremity in the workplace, such as Hand-Arm Vibration Syndrome. The effect of vibration on the lower extremity, including the feet, has not been studied to the same extent, although the symptoms can be similar. Tammy Eger and colleagues provide a review of the literature related to the health risks associated with foot-transmitted vibration and then present the results of a field study in mining which showcases the symptoms and risks of vibration-induced white feet. Acceleration profiles collected from five mobile steel making machines in the field were used by Conrad et al. to drive a six degree of freedom robot, upon which participants were placed in

three different seats, in this lab-based study. The effectiveness of the seats for attenuating whole body vibration to the operator was evaluated.

Comparative analyses of workplace equipment are presented in three studies, with the intent of providing specific recommendations for use and safety. The purpose of the study by Moser et al. was to advise the Ontario Ministry of Natural Resources on the best load carriage system to transport the Mark 3 water power pump used in wildfire fighting. Hunt et al. evaluated different glove options used by electric utility workers in simulated cold outdoor weather conditions. A series of three experiments involving simulated workplace tasks were conducted by Godwin and Eger to evaluate the usability and preference of different features of helmets and head-mounted personal protective equipment, including cap lamps and helmet brims.

Three papers focused on various biomechanical characteristics of manual lifting in different populations are also provided. Abdoli and Potvin address the effects of lift pace on the biomechanical loads associated with lifting propane cylinders in the workplace, in addition to looking at differences between novice lifters and an expert. A comparison of amplitude and temporal characteristics of trunk neuromuscular patterns during a controlled dynamic lifting task is presented by Kozey et al. for groups of participants with and without a recent low back injury. In the third lifting study, Dumas and colleagues quantify the lifting postures of pregnant and non-pregnant women in the Republic of Benin, West Africa. The risk of musculoskeletal disorders associated with these postures, particularly for the pregnant women, was determined to be high.

Prevention of musculoskeletal disorders or injury is the ultimate purpose of the study reported by Azar et al., who advanced their previous research on the low back to include peak and cumulative loads on the shoulders of people during activities outside of work. Documenting the biomechanical loads experienced during both work and non-work activities will provide a more complete picture of the musculoskeletal injury risk that people face on a daily basis. The importance of scheduled paid work for retired older adults for the promotion of healthy aging is reported on by Doan and colleagues in their survey of Albertans. Work was found to be an important component of the daily physical activity of this sample, but it was noted that musculoskeletal disorders were reported. The authors suggest that further evaluation is required in order to define safe levels of work for this specific population.

The last article of the special issue was written by Joan Stevenson herself. Coming full circle from her three primary areas of research concentration, as highlighted in the lead article, Joan comments on where she believes more research is needed to reduce the risks of musculoskeletal disorders in workers, within her *Sounding Board* article. In this paper, Joan challenges researchers to continue to advance the topics she has studied over her career, with the overall goal of enhancing the impact of occupational biomechanics and ergonomics on improving jobs for workers.

It is with great admiration and respect for Joan Stevenson and her work that I present this issue to the readers of *WORK*. It was a sincere pleasure being part of this special project. I have had the privilege of working with Joan and learning from her over the years, and as reflected in the broad body of excellent work

that she has had a hand in creating through the network of colleagues and students who she has mentored and trained, the influence she has had on Canadian research in the areas of occupational biomechanics and ergonomics has been considerable and will be forever felt. Enjoy!

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