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Quebec Research on Work-related Musculoskeletal Disorders
Deeper Understanding for Better Prevention
Recherche québécoise sur les troubles musculo-squelettiques liés au travail
Une meilleure compréhension pour une meilleure prévention
Investigación quebequense sobre los trastornos musculo-esqueléticos vinculados al trabajo
Una mejor comprensión por una mejor prevención

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Article abstract

This paper aimed to demonstrate the contribution of the research performed by the musculoskeletal disorders (MSD) Research Axis group of the Quebec Occupational Health and Safety Research Network towards better understanding of work-related MSD (WMSD) development and prevention. Although the group targets its work to the Quebec population, its work has significant impact around the world, placing MSD axis members and knowledge and expertise created in Quebec on the international map. Results from the contribution of members are relevant, primarily in the demonstration of the implication of physical workload as well as organizational and psychosocial work-related factors in the development of WMSDs. Also, members have demonstrated that gender, sex, social class, age and ethno-cultural groups interact in various ways with WMSD determinants. Efforts are devoted towards improving understanding of the physiological responses linked with MSDs, which could also lead to new workplace practices in rehabilitation. The group emphasizes the integration of prevention procedures from the design stage to the workplace intervention. Members have proposed research-based tools for best practices at work and also an original conceptual model as a key, novel element of a theoretical conceptualization of WMSDs. Moreover, the group focuses on improving WMSD surveillance, using multiple sources of information, providing information on newly identified health risks and developing new methods of assessing risk in order to effectively prevent disability in the working population. Finally, results from research of the MSD axis group have implications for orienting legal processes, improving legal recognition of MSDs as occupational diseases, and contributing to the evolution of legal thinking. However, much remains to be done. To that end, the group plans and encourages new initiatives for further advancement. In conclusion, the originality of the work places the group in a favourable position to address the complexity underlying WMSDs, combining expertise that enriches fundamental, clinical and population-based research.

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Quebec Research on Work-related Musculoskeletal Disorders: Deeper Understanding for Better Prevention

Julie N. Côté, Suzy Ngomo, Susan Stock, Karen Messing, Nicole Vézina, David Antle, Alain Delisle, Marie Bellemare, Marie Laberge and Marie St-Vincent

Work-related musculoskeletal disorders (WMSDs) represent a complex and multi-faceted challenge, requiring multi-disciplinary, multi-perspective research approaches ranging from fundamental, basic science research to studies of applied workplace-based interventions. Members of the MSD Research Axis of the Quebec Occupational Health and Safety Research Network have been actively engaged in WMSD research across this full spectrum, contributing to significant knowledge advances on WMSD. Despite this, many facets of WMSDs remain insufficiently understood, and WMSDs remain a considerable problem for our society. Advances on interventions to decrease risk and improve workers' health are notable, although the level and quality of evidence about the effectiveness of ergonomic interventions must be improved. This paper highlights contributions of the group towards the advancement of understanding and prevention of WMSDs.

KEYWORDS: **MSD axis, workplace, disease, basic/applied research**

Introduction

Musculoskeletal disorders (MSDs) refer to a variety of symptoms and inflammatory or degenerative disorders of musculoskeletal structures. These can affect tendons, muscles, ligaments, synovial tissues, bones and joints, intervertebral

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discs, nerves and blood vessels (Stock *et al.*, 2011). The Scientific Committee for Musculoskeletal Disorders of the International Commission on Occupational Health describes Work-related MSDs (WMSDs) as a wide range of inflammatory or degenerative diseases and disorders that result in pain and functional impairment (Kilbom, 1994). While WMSDs may manifest suddenly, they usually evolve in response to cumulative micro-trauma, indicating an imbalance between the body's capacity for temporary adaptation to physical stresses and its ability to repair tissue (Pujol, Condouret and Le Tinnier, 1993).

WMSDs have been the subject of multi-level research approaches that range from fundamental, basic research to the study of applied workplace-based interventions. Over the last 10 years, members of the Research Axis on MSD of the Quebec Occupational Health and Safety Research Network (QOHSRN) have been actively engaged in WMSD research across this full spectrum. Their expertise in both basic and applied research in this area has increased considerably, and our understanding of WMSD etiology, prognostic factors and mechanisms linking risk factors to musculoskeletal disorders has improved. However, the understanding of the process of evolution of WMSDs from acute to chronic stages and the understanding of the mechanisms by which psychosocial and biomechanical exposures interact and contribute to WMSD all remain incomplete. This paper aims to present the spectrum of past and ongoing research of QHSRN members of the MSD axis. In particular, research efforts aimed at advances in 1) understanding of factors that contribute to the development of WMSD and underlying physiological and biomechanical mechanisms, 2) measuring the burden of illness associated with WMSD and development of improved WMSDs surveillance systems, and 3) development and evaluation of multi-level interventions to prevent WMSD and associated long-term disability will be described in subsequent sections.

Epidemiology of WMSD

Work-related MSD are among the most common occupational disorders, and their economic burden has significant impact on our society. Approximately one in five Quebec workers suffers from frequent work-related musculoskeletal symptoms that interfere with their activities (16% among men and 25% among women) (Stock *et al.*, 2011). In the United States, Canada, Finland, Sweden, and England, musculoskeletal disorders cause more work absenteeism and disability than any other group of diseases (Badley, Rasooly and Webster, 1994; Feeney *et al.*, 1998; Leijon, Hensing and Alexanderson, 1998; Woolf, Vos and March, 2010). One of the key objectives of researchers and practitioners dealing with WMSD is to identify factors that contribute to their development and associated disability. Members of our team have contributed to the literature demonstrating

that physical workload as well as organizational and psychological work-related factors all play parts in the development of WMSDs (Delisle *et al.*, 2006; Fuller, Fung and Côté, 2011; Laperrière *et al.*, 2006; Ngomo *et al.*, 2008; St-Vincent *et al.*, 2006). However, the inter-relationships between these risk factors and the causal pathways to the associated outcomes are not well understood, so effective prevention may necessitate the use of more complex analytic tools (Aschengrau and Seage, 2003).

Conceptual Framework of WMSD Development

Over the last decade, theoretical models have been elaborated as conceptual frameworks to better understand the scope of WMSDs research (Armstrong *et al.*, 1993; Haims and Carayon, 1998). Through collaborative effort, a group of researchers from the MSD axis has recently developed a multidimensional model of WMSDs that focuses on understanding the relationships between various physical, organizational and psychosocial risk factors, psychological distress and WMSD (Stock *et al.*, 2006b). This conceptual model hypothesizes that psychological distress mediates some of the relationships between psychosocial work exposures and WMSD and that interactions between other work exposures also influence the development of WMSD (Stock *et al.*, 2013). Members of the group are testing their hypotheses concerning this model using data from the 2008 EQCOTESST survey on Quebec working conditions and occupational health and safety (Vézina *et al.*, 2011a, 2011b).

Another model, focusing on the work situation, has been developed by our team members in the field of ergonomics (St-Vincent *et al.*, 2011; Vézina, 2001). Like some other ergonomics models, it is systemic, holistic (Dul *et al.*, 2012) and is focused on the workers' activities and their self-regulatory process (Guérin *et al.*, 1997). The work situation is considered as a system in constant evolution and the workers through their activities will adapt to changes (e.g., absenteeism of a colleague, rush of production). In doing so, workers develop strategies that manage the interface between variability in the working conditions and individual variability in order to maintain health and production. A concept of "margin of manoeuvre" emerges, which may be likened to a "safety margin" necessary for the worker to be able to find adequate strategies. If this regulation process fails, health can be affected, and the model shows how a reduced margin of manoeuvre resulting from an imbalance between elements of the system can lead to the development of WMSDs. This model and the concept of margin of manoeuvre have been applied to the return-to-work context (Durand *et al.*, 2009, 2011), and have been used to create a tool for the classification of strategies to increase a worker's margin of manoeuvre in order to be able to stay at work (Major and Vézina, 2011).

Socio-cultural Aspects in WMSD Development

Our group has also contributed to the understanding of socio-cultural issues related to WMSDs. For example, a part of our team's research focuses on the biological and social characteristics of men and women in relation to their potential to develop WMSDs (Côté, 2011; Laberge, Vézina and Saint-Charles, 2012; Messing *et al.*, 2003; Messing and Mager Stellman, 2006; Theberge, 2011). This work takes into account the distinctions between gender and sex; i.e. gender is associated "with socially constructed roles, relationships, behaviours, relative power, and other traits that societies ascribe to women and men. Sex is typically understood to refer to the biological and physiological characteristics that distinguish females from males." (Canadian Institutes of Health Research: <http://www.cihr-irsc.gc.ca/e/32019.html>). However, sex and gender are interrelated and often confused in the literature. Some biological sex differences are well established. For example, studies have shown that men have a greater ratio of type II (fast) to type I (fatigue-resistant) muscle fibres (Mannion *et al.*, 1997, 1998; Staron *et al.*, 2000), possibly explaining male-female differences in fatigability (Clark *et al.*, 2003). Generally, we stress the importance of considering that gender, sex, social class, age and ethno-cultural group membership interact in various ways with WMSDs determinants (Habib and Messing, 2012; Lederer, Rivard and Mechakra-Tahiri, 2012; Premji *et al.*, 2010; Seifert *et al.*, 2007). Therefore, it is important that these be specifically considered in relation to causal pathways, rather than simply treating gender, age, ethnicity and class as confounders in multivariate analyses (Messing, Stock and Tissot, 2009). For example, if women have higher rates of WMSDs because they are concentrated in jobs that expose them to specific work-related factors, then female gender will be associated with disease only because women are more exposed. In this case, controlling for sex would result in underestimation of a true exposure-effect relationship. Separate analyses by gender often lead to better identification of risk factors. Similarly, specific examination of the relationships of age, ethnicity and social class with risk factors can lead to a more sophisticated understanding of the determination of WMSDs.

WMSD Exposure Measurement and Underlying Physiological Mechanisms

The identification of pathogenetic factors for WMSDs appears problematic, given the paucity of data that integrate basic research with clinical findings. In addition to efforts to improve methods for measuring exposure in self-reported surveys (Stock *et al.*, 2005b), members of the MSD axis have worked on developing methods to collect individual-level measures of biomechanical work exposure (Delisle *et al.*, 2005, 2009; Laperrière *et al.*, 2006; Plamondon *et al.*, 2007). Since

continuous recording generates enormous amounts of data, researchers are exploring methods to select the exposure measures most relevant to the risk under study. Moreover, it is common practice to characterize exposures in terms of amplitude, intensity, frequency or duration. However, standards for these parameters are lacking. Are there thresholds or cut-off values beyond which exposure starts having harmful effects? How do these thresholds vary among individuals and situations?

Some members of the MSD axis conduct research on neuromuscular mechanisms that may control the response to excessive exposure, focusing particularly on the biomechanical aspects of motor control (Côté *et al.*, 2008; Fuller, Fung and Côté, 2011) and functional organization of the central nervous system (CNS) (Ngomo, Leonard and Mercier, 2012; Ngomo *et al.*, 2011). For example, acute pain appears to stimulate complex adaptations such as increased movement variability, whereas chronic pain appears to limit variability (Côté and Hoeger Bement, 2010). A better understanding of these physiological responses could be helpful in suggesting new workplace practices in rehabilitation (Srinivasan and Mathiassen, 2012). Moreover, changes in the CNS have been documented in patients with MSDs (Boudreau, Farina and Falla, 2010; Clark *et al.*, 2008; Ngomo, Leonard and Mercier, 2012; Van Vliet and Heneghan, 2006). The chronicity of the deficit appears to be the main factor related to the decreased excitability, since no variation was observed in relation to pain level, functional deficit or strength deficit (Ngomo *et al.*, 2012). Understanding the role played by the CNS in chronic MSDs could suggest methods to improve the management of patients with such disorders.

WMSD Surveillance and Prevention

Surveillance of WMSD can take various forms depending on the objectives and the contexts in which they are applied. In Quebec, the prevention of WMSD is a public health priority of the Quebec Ministry of Health and Social Services and includes both surveillance and public health preventive activities in the workplace. WMSD surveillance occurs through a series of surveys of the prevalence of WMSD, related work absence and prevalence of work exposures (Arcand *et al.*, 2001; Stock, 2006; Stock *et al.*, 2011; Stock and Pelletier, 2011) and studies of the incidence of WMSD compensated by Quebec's Occupational Health and Safety Commission (Michel, 2010; Stock, 2006). The Scientific Group on WMSD and the Occupational Health Surveillance Team of the Quebec Institute of Public Health, of which several members are also members of the QOHSRN, used workers' compensation data to develop indicators to enable practitioners to estimate risks of WMSD by occupation and industrial sector, stratified by age and gender, to assist with establishing priorities for preventive action. More work is needed to develop valid WMSD indicators based on information other

than workers' compensation data. Such measures could include both leading and lagging indicators.

Access to multiple indicators allows triangulation to identify sub-groups with high levels of risk that would benefit from specific prevention interventions. For example, the annual incidence of WMSDs in Quebec has been estimated by workers' compensation data, complemented by survey data on WMSD prevalence such as those of the 1998 Quebec Health and Social Survey (Arcand *et al.*, 2001) and the 2007-2008 Quebec Survey on Working and Employment Conditions and Occupational Health and Safety (Stock *et al.*, 2011). Using multiple sources of information on occupational health outcomes and work exposures also provides information on new risks to health. Several members of the MSD axis contribute to this aspect of epidemiologic surveillance. Participating in MSD surveillance may lead to the development and optimization of tools for intervention. WMSD surveillance remains an important component of the prevention process, that also provides evidence-based information needed to influence public policy on WMSD prevention (Stock and Pelletier, 2011).

Public health prevention initiatives include a recently implemented program for the identification of workplace risk factors of WMSD, delivery of training and information to the workplace and occasional support to the workplace in identifying and implementing solutions carried out by the Public Health Occupational Health Network of occupational physicians, nurses, hygienists, hygiene technicians and ergonomists (Stock *et al.*, 2006a). Stock and colleagues have carried out an evaluation of the implementation of this WMSD prevention program, and plan to eventually carry out an economic evaluation and an evaluation of the effectiveness of WMSD prevention activities carried out by the public health network.

The group also emphasizes the integration of prevention procedures from the design stage to the adaptation of workstations. During the last decade, members of the MSD axis have contributed to the transformation of the design of work situations, adapting WMSD prevention programs to the reality of factory and service occupations. These ergonomic programs have been created from conceptual tools developed for diagnosis of work situations at risk for MSDs, taking occupational health into account throughout the design process (Bellemare *et al.*, 1996, 2002). Although recent studies have suggested that there is currently a lack of evidence for the efficacy of ergonomic intervention programs in preventing WMSDs (Aas *et al.*, 2011; Van Oostrom *et al.*, 2009), they have not evaluated efficacy in a way that takes into account their multilevel scope. In addition, they have not addressed poor program implementation issues (Drissen *et al.*, 2010). Developments in the fields of WMSD surveillance and intervention are complementary and provide necessary advances towards the overall improvement of workplace health.

Lastly, legal reforms are necessary to improve management and workers' compensation of MSD. For a long time, teams led by medical doctors assessed most of the medical evidence at the Quebec's workers' compensation board (CSST), especially in dispute cases. Recently, more use has been made of the expertise of ergonomists. Quebec workers' compensation legislation allows for compensation of health problems either as occupational diseases or as work accidents, but both types of claim are frequently appealed. Ergonomists can now provide expertise that can influence on the decisions of the CSST, especially in cases where the true work demands must be assessed and distinguished from its formal requirements (Lippel, 2009). Members of the MSD axis, in collaboration with members from other disciplines, bring their knowledge to the legal processes, improving the rate of legal recognition of WMSDs as occupational diseases and contributing to the evolution of legal thinking (Règlement sur la santé et la sécurité du travail, R.R.Q., c. S-2.1, r. 19.01, art. 166-171).

Multi-level Interventions

MSDs limit the quality of life of affected workers and also diminish workplace productivity (Arnetz *et al.*, 2003; Palmer *et al.*, 2012; Vermeulen *et al.*, 2010) and have personal, social and economic consequences (Baldwin and Butler, 2006; Feuerstein and Loisel, 2011). Our group aims to improve multi-level and multi-component interventions around WMSDs. For example, a multi-component intervention to prevent low back pain can include workplace commitment to reducing back injuries, purchasing of appropriate equipment to reduce biomechanical hazards and a broad-based ergonomics training program that includes safe handling (Tullar *et al.*, 2010). In 2006, a series of papers in the *Journal of Occupational Rehabilitation* indicated that scientific progress had been made over the past decade in identifying physical and psychosocial factors in both the etiology and exacerbation of MSDs (Feuerstein *et al.*, 2000; Feuerstein and Harrington, 2006). Members of the WMSD axis actively participate in that progress, notably in contributing to filling gaps between knowledge and practical use of appropriate tools and also in the implementation of comprehensive interventions aimed at reducing MSDs. Moreover, as musculoskeletal disorders have a multifactorial etiology, multiple approaches to targeting primary, secondary and tertiary interventions are essential for combatting WMSDs. To this end, our members have proposed research-based tools to guide best practices at work. These tools are considered an important part of knowledge transfer to ensure that workplaces appropriate research results. For example, a prevention guide for manual materials handling and customer service in warehouse superstores has been published by St-Vincent *et al.* (2008). This document contains a checklist to identify problems and solutions and means to evaluate the effectiveness of the process using a grid (St-Vincent *et al.*, 2008).

More recently, group members collaborated on a detailed manual for developing ergonomic interventions. This book seeks to help ergonomists accompany stakeholders in a process of improving work, preserving health and optimizing production. It proposes a model of the person in work activity and a model for intervention, explains the main concepts underlying an ergonomic intervention and describes the major steps of an intervention (St-Vincent *et al.*, 2011).

Group members also developed a guide and series of intervention tools to support companies in implementing a modified work program to facilitate retention and return-to-work of workers with WMSD. This guide was designed to meet the needs of injured workers and employers in the management of employees with WMSDs. In this guide, the authors propose steps for setting up a return-to-work program, an algorithm for offering modified work to injured workers and documents as MSD-specific decision support tools for evaluating work demands of proposed modified jobs, for communicating work demand proposals to physicians and for physicians to prescribe temporary work restrictions to employers (Stock *et al.*, 2005a).

Despite these contributions, much remains to be done to improve the effectiveness of interventions targeting WMSDs. First, a better understanding of the implementation process, a documentation of the degree to which intended elements of the intervention were in fact implemented and the resources dedicated to these interventions as well as the factors that influence implementation need greater attention. The intervention should be considered as a process taking place in a given context and therefore should be precisely described (Baril-Gingras, Bellemare and Brisson, 2012). Second, the level and quality of evidence supporting ergonomic interventions to improve comfort, safety and/or productivity of workers with symptoms of WMSDs must be increased (Kennedy *et al.*, 2010; Van Niekerk, Louw and Hillier, 2012). The level and quality of evidence supporting ergonomic interventions to reduce mechanical exposures is also lacking. Third, with respect to ergonomic interventions designed for workplaces, more worker support is still necessary in order to optimize the effectiveness of interventions. Few evaluations are available of the use of prevention guides by workplaces. Research is still lacking in regard to ergonomic interventions for certain type of disorders and/or for certain job categories. For instance, tendon disorders of the lower extremities are relatively common but have rarely been studied (Burdorf, Naaktgeboren and De Groot, 1993; Janwantanakul *et al.*, 2010; Kalra *et al.*, 2010; Kennedy *et al.*, 2010). Several group members study determinants and effects of prolonged standing at work (Messing, Tissot and Stock, 2008), in the hope of producing suggestions for an optimal mix of working postures between standing, sitting and walking (Laperrière *et al.*, 2006; Ngomo *et al.*, 2008). It appears that worker control over posture is an important health determinant (Messing, Tissot and Stock, 2008). Social support for workers who request better-adapted working conditions is an important component of intervention (Messing *et al.*, 2005).

Perspectives

The goal of eliminating WMSDs has motivated research efforts across multiple countries and among various actors. To this end, the contribution of the MSD axis of the RRSSTQ is substantial. Although the group's primary focus is on Quebec workers, its work has significant implications around the world, placing MSD axis members and knowledge produced in Quebec on the international map. Members have been involved in organizing major international conferences and symposia on different aspects of WMSD through, for example, the International Commission on Occupational Health's MSD prevention working group. Several members are actively involved in the Francophone MSD Group that organizes international conferences among francophone nations and fosters communication among WMSD researchers. Our team members founded and chaired the Gender and Work Technical Committee of the International Ergonomics Association, which now has active European and Quebec working groups; Messing wrote the World Health Organization policy and information booklet on gender and workplace health (http://www.who.int/gender/documents/Genderworkhealth.pdf). Nicole Vézina and Karen Messing are involved in a project supported by the Canadian International Development Agency to provide gender-sensitive training in MSD prevention in Latin America. The MSD group is favourably positioned to address the complexity underlying WMSDs, combining expertise that enriches fundamental, clinical and population-based research.

To fully appreciate the originality of the group's work, it is important to consider not only its past and current work, but also future prospects. New initiatives on the development of biomechanical, physiological, sensori-neural indicators of MSD are under way. Early indicators of functional limitations associated with WMSDS are also being developed. The group also promotes evaluation studies of the impact of policies, laws and regulations designed to prevent WMSDs. Finally, more work is currently undertaken in modeling the conceptual framework to better understand the work activity process and structures in relation to WMSDs.

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SUMMARY

Quebec Research on Work-related Musculoskeletal Disorders: Deeper Understanding for Better Prevention

This paper aimed to demonstrate the contribution of the research performed by the musculoskeletal disorders (MSD) Research Axis group of the Quebec Occupational Health and Safety Research Network towards better understanding of work-related MSD (WMSD) development and prevention. Although the group targets its work to the Quebec population, its work has significant impact around the world, placing MSD axis members and knowledge and expertise created in Quebec on the international map. Results from the contribution of members are relevant, primarily in the demonstration of the implication of physical workload as well as organizational and psychosocial work-related factors in the development of WMSDs. Also, members have demonstrated that gender, sex, social class, age and ethno-cultural groups interact in various ways with WMSD determinants. Efforts are devoted towards improving understanding of the physiological responses linked with MSDs, which could also lead to new workplace practices in rehabilitation. The group emphasizes the integration of prevention procedures from the design stage to the workplace intervention. Members have proposed research-based tools for best practices at work and also an original conceptual model as a key, novel element of a theoretical conceptualization of WMSDs. Moreover, the group focuses on improving WMSD surveillance, using multiple sources of information, providing information on newly identified health risks and developing new methods of assessing risk in order to effectively prevent disability in the working population. Finally, results from research of the MSD axis group have implications for orienting legal processes, improving legal recognition of MSDs as occupational diseases, and contributing to the evolution of legal thinking. However, much remains to be done. To that end, the group plans and encourages new initiatives for further advancement. In conclusion, the originality of the work places the group in a favourable position to address the complexity underlying WMSDs, combining expertise that enriches fundamental, clinical and population-based research.

KEYWORDS: MSD axis, workplace, disease, basic/applied research

RÉSUMÉ

Recherche québécoise sur les troubles musculo-squelettiques liés au travail : une meilleure compréhension pour une meilleure prévention

Le présent article a pour but de démontrer la contribution de la recherche effectuée par le regroupement stratégique troubles musculo-squelettiques (TMS) du Réseau de recherche en santé et sécurité du travail en vue de mieux comprendre le développement et la prévention des troubles musculo-squelettiques liés au travail. Bien que la cible du groupe soit la population québécoise, son travail a un impact important ailleurs dans le monde, plaçant les membres du regroupement, leurs connaissances et l'expertise qu'ils ont acquise au Québec sur l'échiquier international. Les résultats qui ont découlé de la contribution des membres sont pertinents, particulièrement en ce qui touche la démonstration des effets de la charge de travail physique de même que des facteurs organisationnels et psychosociaux du monde du travail dans le développement des troubles musculo-squelettiques liés au travail. De plus, les membres ont prouvé que le sexe, le genre, la classe sociale, l'âge et les groupes ethnoculturels interagissent de diverses façons avec les déterminants des troubles musculo-squelettiques liés au travail. Des efforts ont été entrepris pour mieux comprendre les réponses physiologiques liées aux troubles musculo-squelettiques, et ils pourraient bien amener de nouvelles pratiques de réhabilitation en milieu de travail. Le groupe souligne l'intégration des procédures de prévention au départ de la conception de celles-ci jusqu'à l'étape d'intervention en milieu de travail. Les membres ont proposé des outils basés sur la recherche pour instaurer des pratiques exemplaires en milieu de travail de même qu'un modèle conceptuel original comme étant une clé, un élément novateur dans la conceptualisation théorique des troubles musculo-squelettiques liés au travail. De plus, le groupe met l'accent sur l'amélioration du dépistage des troubles musculo-squelettiques liés au travail en utilisant de multiples sources d'information, en fournissant de l'information sur les nouveaux risques identifiés pour la santé et en mettant sur pied de nouvelles méthodes d'évaluation des risques pour prévenir de façon efficace ces troubles au sein de la population au travail. Enfin, les résultats de la recherche du regroupement stratégique sur les TMS ont des implications pour l'orientation des processus juridiques, l'amélioration de la reconnaissance juridique des troubles musculo-squelettiques comme maladies professionnelles, et la contribution à l'évolution de la pensée juridique. Toutefois, il reste encore beaucoup à faire. Et dans cette optique, le regroupement prévoit et encourage de nouvelles initiatives pour continuer de faire avancer la science. En conclusion, l'originalité de ce travail met le regroupement dans une position favorable pour se pencher sur la complexité qui sous-tend les troubles musculo-squelettiques liés au travail en combinant des expertises qui sauront enrichir la recherche fondamentale, clinique et basée sur les populations.

MOTS-CLÉS : axe TMS, milieu de travail, maladie, recherche fondamentale/appliquée

RESUMEN

Investigación quebequense sobre los trastornos musculo-esqueléticos vinculados al trabajo: una mejor comprensión por una mejor prevención

El presente artículo busca demostrar la contribución de la investigación efectuada por el reagrupamiento estratégico TMS (trastorno musculo-esqueléticos) de la Red de investigación en salud seguridad ocupacional con el objetivo de comprender mejor el desarrollo y la prevención de los trastornos musculo-esqueléticos vinculados al trabajo. Aunque la mira del grupo sea la población quebequense, su trabajo tiene un impacto importante en otras partes del mundo, posicionando en el ámbito internacional los miembros del reagrupamiento, sus conocimientos y la pericia adquirida en el Quebec. Los resultados que han derivado de la contribución de los miembros son pertinentes, particularmente en lo que se refiere a la demostración de los efectos de la carga de trabajo física así como de los factores organizacionales y psicosociales del mundo del trabajo en el desarrollo de trastornos musculo-esqueléticos vinculados al trabajo. Además, los miembros han probado que el sexo, el género, la clase social, la edad y los grupos etnoculturales interactúan de diversas maneras con los determinantes de los trastornos musculo-esqueléticos. Se han desarrollado esfuerzos para comprender mejor las respuestas fisiológicas vinculadas a los trastornos musculo-esqueléticos, y éstos podrían aportar nuevas prácticas de rehabilitación en el medio de trabajo. El grupo resalta la integración de procedimientos de prevención al inicio de la concepción de dichas prácticas hasta la etapa de la intervención en el lugar de trabajo. Los miembros han propuesto útiles basados en la investigación para instaurar prácticas ejemplares en el lugar de trabajo y un modelo conceptual original que constituye una clave, un elemento innovador en la conceptualización teórica de los trastornos musculo-esqueléticos vinculados al trabajo. Además, el grupo pone el énfasis en la mejora del despistaje de los trastornos musculo-esqueléticos vinculados al trabajo utilizando para ello múltiples fuentes de información, procurando la información sobre los nuevos riesgos de salud identificados e implementando nuevos métodos de evaluación de riesgos para prevenir de manera eficaz esos trastornos en el seno de la población trabajadora. Finalmente, los resultados de la investigación del reagrupamiento estratégico sobre los TME tienen implicaciones para la orientación de los procesos jurídicos, la mejora del reconocimiento jurídico de los TME como enfermedades ocupacionales, y la contribución a la evolución del pensamiento jurídico, Sin embargo, queda todavía mucho por hacer. Y en esta óptica, el reagrupamiento prevé y alienta nuevas iniciativas para continuar a hacer avanzar la ciencia. En conclusión, la originalidad de este trabajo ofrece al reagrupamiento una posición favorable para abocarse a la complejidad subyacente a los trastornos musculo-esqueléticos vinculados al trabajo, combinando las calificaciones expertas que sabrán enriquecer la investigación fundamental, clínica y empírica, basada en las poblaciones.

PALABRAS CLAVES: eje trastornos musculo-esquelético, enfermedad, investigación fundamental/aplicada