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LETTER TO EDITOR

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A CONCEPTUAL MODEL OF MUSCULOSKELETAL DISORDERS FOR OCCUPATIONAL HEALTH PRACTITIONERS

Dear Editor,

Musculoskeletal disorders (MSDs) are among the most common and costly health problems among working populations, and constitute a major cause of disability [1]. Occupational health practitioners must manage, prevent, and assess the work-relatedness of this large and diverse set of disorders, which affect different body parts and have different risk factors, treatments, and prognoses. The relationships of workplace exposures to MSDs are often difficult to assess, due to the multifactorial nature of these disorders, differing findings in the medical literature on the associations between personal and work-related factors, and the difficulties in applying the results contained in the existing literature to individual patients. However, the assessment of work-related factors is often central to decisions regarding the treatment, work ability, and compensation.

The multifactorial nature of MSDs has been well described: personal, psychosocial, and workplace physical exposures are all associated with higher rates of MSDs in working populations [2–7]. The assessment of etiology is very complex because MSDs affecting any body part comprise a diverse set of outcomes, ranging from symptoms of discomfort to long-term work disability. The discussions devoted to work-related risk factors of MSDs often fail to consider that different risk factors may influence different stages of disease severity. For instance, risk factors assessed among workers qualified for surgery or among those with long-term disability may be different from risk factors assessed among newly symptomatic workers. While integrated models of impairment and disability describe this spectrum of severity [8], they do not explicitly address the differences in work-related etiological or prognostic factors among workers with different outcomes [9–11]. We present a diagram of a simple conceptual model (Figure 1) that may clarify this issue for researchers and practitioners. This conceptual model provides a framework for designing research studies and testing hypotheses using mathematical models.

Figure 1 shows a "pyramid of disability", with the base comprising workers without any symptoms of MSDs. Some workers subsequently experience symptoms of MSDs, but do not seek treatment, while others seek treatment, but experience no work disability. A smaller number of them progress to short-term or chronic functional impairment and work disability. As the risk changes, the recovery of function and alleviation of symptoms occurs, and workers move back down to the lower levels of the pyramid. Therapeutic interventions, work-related and non-work-related exposures to physical and psychosocial stressors, medical co-morbidities, workplace policies, and a variety of other personal and social factors can mediate transitions between the levels of this pyramid. The risk factors that play the predominant role in the initial transition from asymptomatic to symptomatic

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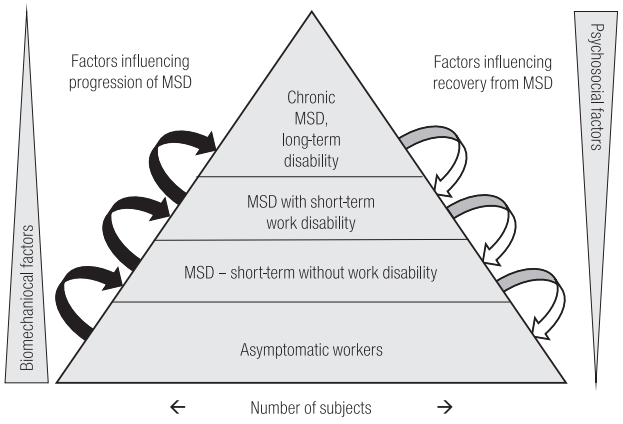

Fig. 1. Diagram presenting a conceptual model of the "pyramid of disability"

level may differ from the factors that most strongly affect the prognosis and disability among the symptomatic workers.

There are suggestions in the existing literature that work-related biomechanical factors are probably more strongly associated with the initial incidence of MSDs and transitions between the levels at the bottom of the pyramid [4,12–14], whereas psychosocial and psychological factors may be more strongly associated with the outcome and prognosis [15]. These differences in contribution are likely to be relative, not absolute – psychosocial factors may play a role in early presentation of some disorders [5,16] and changes in workplace ergonomics have been associated with faster return-to-work among those with long-term work absence [17].

Few studies have examined separately the risk factors concerning transitions between different stages of symptoms and disability, nor have most reviews considered separately the risk factors for different outcomes such as MSDs without time loss and MSDs with prolonged time loss. If the risk factors for these outcomes differ, this may explain some of the lack of clarity in the current literature on work-related risk factors and MSDs. It may also explain to some extent the different views on the work-relatedness of MSDs held by different practitioners. Musculoskeletal specialists such as rheumatologists, rehabilitation specialists, and hand or back surgeons typically see workers referred to them because of prolonged symptoms or work disability, while primary care physicians or occupational health practitioners may be the first to see a newly symptomatic worker; different practitioners may form different conceptions regarding the association between work and MSD that are relevant to their typical patient population. However, research findings or clinical experience related to particular MSD outcomes may not be generalizable to outcomes with greater or lesser severity.

We suggest that clinical practice and future research consider that factors influencing the onset, progression, and recovery from various stages of MSD severity are probably different, and assessments of work-related factors should take into account different stages of MSD severity and progression toward impairment and disability. The model is intended to be a simple illustration of potential differences in relevant risk factors at different stages of progression of MSDs [18]. Studies of MSDs must take into account their multifactorial nature, the complex relationships between biomechanical and psychological factors [19], and diversity of symptoms and disability outcomes seen in populations with work exposures [20]. Further work using this framework would be required to demonstrate the validity and utility of the model based on this concept. The model we have presented is simplistic and requires empiric validation, but may be useful in explaining the differences in views and research findings on work-related risk factors and MSDs. It might encourage further discussions and practical studies in the area of etiology, prevention and treatment of MSDs.

Key words:
Musculoskeletal disorders, MSD, Models, Occupational, Practitioners

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