

DoD Ergonomics Working Group NEWS



Issue 72, December 2007

www.ergoworkinggroup.org

Psychosocial Factors and Musculoskeletal Disorders

The purpose of this short article is twofold:

- To reinforce the importance of the multifactorial nature of musculoskeletal disorders (MSDs).
- To emphasize the value of considering both work-related and non-occupational (psychosocial and others) sources of exposure when conducting an occupational ergonomic analysis or a study of affected workers.

The well-accepted notion that MSDs are multifactorial in nature continues to challenge researchers and occupational health professionals. Many workers develop MSDs that are not work-related, and other workers with high levels of exposure have few to no symptoms. Traditional ergonomic analyses are focused on physical exposures including but not limited to rapid work pace, repetitive motions, forceful exertions, non-neutral working postures, vibration, and ambient temperature.

These exposures have been and continue to be studied extensively. They rarely occur in isolation and evidence supports an *interaction* effect when workers are exposed to more than one of these factors at a time. An interaction occurs when two separate exposures (e.g., non-neutral posture and forceful exertions) combine (interact) in such a way that their effect on the worker is greater than it would be if each exposure occurred separately. There is an extensive and growing body of scientific literature showing associations between these exposures and adverse musculoskeletal health outcomes.

Recently, more attention has shifted to the associations among non-occupational exposures and musculoskeletal outcomes. Psychosocial exposures include, but are not limited to:

- Socioeconomic status
- Job and home stress
- Supervisor relationships
- Coworker support
- Perceived job demands
- Work organization
- Individual control over work environment

Though not considered direct work exposures, age, health status, smoking status, and ethnicity are also factors that have been shown to be associated with adverse musculoskeletal outcomes. Current literature supports strong associations between work-related physical exposures and MSDs and less significant associations between nonphysical factors and musculoskeletal outcomes (National Research Council 2001; Punnett and Wegman 2004). Some authors (Gatchell et al. 1995; Linton 2000) have suggested that psychosocial factors may weigh more heavily on both the development of LBP and related disability than physical and biomechanical factors.

Continued on page 2

This overview would not be complete without a brief description of *confounding*. In epidemiological studies, confounding occurs when one is studying the effect of a primary risk factor of interest (e.g., high work demands) on a health outcome (e.g., back pain), and another risk factor is present (e.g., home stress) that is associated with, or has an influence on, the primary risk factor of concern. For example, home stress is a confounder since workers in higher demand jobs typically have higher levels of home stress due to financial and other strains.

Another extensively researched example is the potential *causal* relationship between smoking status and low back pain. It can be argued that smoking causes measurable physiological tissue changes that increase one's risk for developing back pain or extending recovery time after an injury. However, smoking status is also associated with socioeconomic status, health status, and high work demands, all of which can be considered as primary exposures.

The literature is rich with debate about how physical and psychosocial exposures are related to each other as confounders or how they potentially interact with each other. It has been suggested that certain psychosocial exposures may contribute to an interaction effect. For example, an individual who has significant home stressors (financial, marital, etc.) may also be developing wrist tendonitis due to forceful and repeated exertions. The manner in which the individual performs his or her work (work style) may interact with the existing physical exposures to compound the effects of the exposure. Thus, the potential for developing an MSD may be greater than the effect of either of these factors in isolation.

This review is not intended to suggest that standard ergonomic exposures should not continue to be measured, analyzed, and prevented to the maximum extent possible. Best practice examples and guidelines should continue to be sought and advertised. Well-established physical exposures certainly fit more into ergonomists' "comfort zones" than the fuzzy and ill-defined psychosocial factors. However, the multifactorial nature of MSDs reinforces the importance of addressing and not avoiding these factors when conducting ergonomic analyses. The literature supporting the associations among physical, psychosocial, and other non-occupational exposures and health outcomes continues to grow, as does improved measurement tools.

For more information, see the references cited below. Much of the information included in this article was extracted from Punnett and Wegman (2004).

References

Gatchel RJ, Polatin PB, Kinney RK. 1995. Predicting outcome of chronic back pain using clinical predictors of psychopathology: A prospective analysis. *Health Psychology* 14:415-420

Linton SJ. 2000. A review of psychological risk factors in back and neck pain. *Spine* 25:1148-56.

National Resource Council and Institute of Medicine. 2001. *Musculoskeletal disorders and the workplace: Low back and upper extremities*. Washington, DC: National Academy Press.

Punnett L, and Wegman D. 2004. Work-related musculoskeletal disorders: The epidemic evidence and the debate. *Journal of Electromyography and Kinesiology* 14:13-23.