

Occupational Ergonomics

POSITION STATEMENT

Sponsored by the AIHA® Ergonomics Committee

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The American Industrial Hygiene Association (AIHA) believes that occupational ergonomics is a multidisciplinary science whose primary focus is to design the workplace and job demands to fit the capabilities of the working population. From a practical standpoint, this involves the anticipation, recognition, evaluation, and control of musculoskeletal disorders (MSDs) and their risk factors in the workplace.

These objectives are met by applying principles based on the physical and psychological capabilities of workers to the design or modification of their jobs, equipment, products, and workplaces.

The goals of improving ergonomics of the workplace include the following:

- Decrease exposure to risk factors that cause musculoskeletal injuries and illnesses
- Improve worker comfort and the quality of work life
- Improve worker performance

Proper application of ergonomic principles can achieve benefits that are significant and immediate. The benefits of well-designed jobs, equipment, products, work methods, and workplaces include:

- Improved safety and health program performance
- Improved quality and productivity
- Reduction in errors
- Heightened employee morale
- Reduced workers' compensation and operating costs
- Accommodation of diverse populations, including those with restrictions or disabilities

This position statement will serve as the basis for AIHA's action on behalf of the industrial hygienists and other OEHS professionals it serves. A summary of AIHA's major positions is as follows:

1. A wide range of scientific data clearly demonstrates that:
 - Work-related MSDs are a significant and costly health issue nationwide.
 - There are plausible biological mechanisms for the connection between MSDs and exposure to MSD risk factors in the workplace.
 - Poor working conditions can and do contribute to the occurrence of MSDs.
 - Validated analysis tools exist to effectively assess and measure exposure to MSD risk factors in the workplace.
 - Improving workplace and physical task conditions can reduce the prevalence and severity of MSDs.
 - Modifying psychosocial modifiers may help to reduce the prevalence and severity of MSDs.
2. AIHA considers that workplace design guidelines provide useful and effective guidance to those who apply them in the design of their workplace. AIHA supports the development of ergonomics-related reporting, regulations, and standards an effective long-term strategy. [Remove "more" or state what it would be more effective than.] Regulations and standards should be developed through an open process and focus on developing an effective design process: one that improves the fit of the workplace, reduces exposure to MSD risk factors, and improves performance.

3. AIHA supports the continued private and governmental funding for research related to ergonomics. The research agenda should focus on:
- Refinement and validation of current research and models for the pathophysiology of specific MSDs
 - Refinement of dose-response relationships between workplace exposures and the risk of musculoskeletal disorders
 - Continued improvement and validation of exposure assessment tools, which identify and measure exposures to physical, organizational, psychosocial, and personal risk factors
 - Identification of best practices for the control of MSD risks, both generally and in specific industries
 - Clarification of case-management practices for the treatment of MSDs

Comments

1. Scientific Data on Musculoskeletal Disorders

There is a large base of epidemiologic and scientific literature concerning work-related MSDs. Based on a review of this literature, AIHA concludes the following:

- Work-related MSDs, particularly of the low back and upper and lower extremities, are an important national health problem, resulting in approximately 1 million people losing time from work each year. These disorders impose a substantial economic burden in workers' compensation costs, lost wages, and productivity. Cost estimates vary, but a reasonable figure is about \$50 billion annually in work-related costs.
- There is a clear relationship between workplace conditions and MSDs. For the low back, conditions include physical loads (as in manual material handling); tasks that impose high-load moments on the back; and tasks that involve frequent bending and twisting, heavy physical work, and whole-body vibration.
- It is well established that occupational knee disorders are related to kneeling and squatting as well as factors like use of force (e.g., carpet installers' use of knee kickers).

For disorders of the upper extremities, exposures include high physical loads from combinations of repetition, force, non-neutral (awkward) postures, and hand-arm vibration.

- The biology and biomechanics literature shows that there are plausible mechanisms for the association between MSDs and workplace physical exposures.
- A number of analysis tools are available for determining the extent of the risk for an MSD in the workplace. There are numerous, highly credible methods for conducting exposure assessments. These tools have been developed, published in peer-reviewed literature, and validated for determination of risk. Sources include those from North America, Europe, Asia, and Australia.
- These tools can also contribute significantly to the identification of risk-reduction interventions. Modification of the various physical factors can substantially reduce the risk of symptoms for low-back and upper extremity disorders. Many of these interventions are inexpensive, help improve productivity, and can significantly reduce the likelihood of further MSDs. Additionally, modifying the psychosocial factors may help to reduce the risk of these same symptoms.

2. Regulatory Approach

AIHA supports the development of ergonomics-related regulations and standards. Guidelines can also be a useful method to aid in communicating good practices. Organizations that have adopted them have generally succeeded in reducing the number of MSDs and their associated costs.

However, the number of organizations expected to use the guidelines is limited, even though well-structured regulations and standards would have a greater impact on reducing the impact of work-related MSDs. The development process should be conducted in an open manner, where all affected parties can provide input. The discussion should focus on the development of effective health and safety programs to reduce the risk of musculoskeletal disorders. Toward that end, AIHA recommends the following approach:

- Industries and organizations that have addressed MSDs in their workplaces should expand their efforts by focusing on further minimizing employees' risk of MSD injury or illness.
- Those industries and organizations that have not addressed MSDs in their workplaces should expeditiously evaluate the extent of MSDs, then implement a program or process to minimize the exposure to MSD risk factors they find.
- The Occupational Safety and Health Administration should develop a strong and clear minimum standard for the recognition and abatement of MSD risk factors, based on both the best available scientific and medical knowledge and the best practices of effective organizations. In the absence of a federal standard, state OSHA programs should be encouraged to adopt standards to address MSD risk factors.
- OSHA, in conjunction with the Bureau of Labor Statistics, should continue to require employers to record MSDs or "ergonomics injuries or illnesses" on OSHA's Form 300, Log of Work-Related Injuries and Illnesses, and to tabulate the appropriate statistics. AIHA supports the inclusion of a separate column for MSDs on the OSHA 300 log, as required in the original recordkeeping standard that became effective in January 2002.
- In addition to federal or state standards, voluntary consensus standards and guidelines should continue to be developed. These would play an important role in preventing work-related MSDs as well as provide wider recognition of the issue, including in workplaces not subject to federal and state OSHA.

3. Need for Continuing Research

Although precise dose-response relationships are not yet available for all exposure situations, there is a significant and growing body of knowledge related to the relationship between the physical work environment and MSDs. Knowledge related to the roles of personal, organizational, and psychosocial factors is limited. There may be moderating or predisposing factors that interact with physical risk factors.

Increased risk may be reliably predicted under selected conditions, such as extreme levels of physical exertion and posture. The tools in use to assess exposure and predict risk need additional development and validation. Research needs to continue that supports the development and validation of reliable, accurate, and predictive exposure assessment tools.

The National Institute for Occupational Safety and Health should take the lead in developing uniform definitions of MSDs for use in clinical diagnosis, epidemiologic research, and data collection for surveillance systems. These definitions should:

1. include clear and consistent endpoint measures,
2. agree with consensus codification of clinically relevant classification systems, and
3. have a biological and clinical basis.

A research agenda is needed that includes:

1. improving tools for exposure assessment,
2. improving measures of outcomes and case definitions for use in epidemiologic and intervention studies, and
3. further quantifying the relationship between exposures and outcomes.

The agenda should include suggestions for studies in each topic area: tissue mechanobiology, biomechanics, psychosocial stressors, epidemiology, and the effectiveness of workplace interventions.

References

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