

Musculoskeletal Disorders

This PSHSA Fast Facts is intended to help workers, supervisors, managers and members of the joint health and safety committee (JHSC) become aware of possible solutions to real and potential MSD risks in their workplaces.

What are Musculoskeletal Disorders (MSD)?

Musculoskeletal disorders are an injury or disorder of the musculoskeletal system resulting from repeated exposure to various hazards and/or risk factors in the workplace (OHSCO, 2007). The musculoskeletal system includes all muscles, bones, tendons, tendon sheaths, ligaments, bursa, blood vessels, joints, intervertebral discs, etc.

Other terms used to describe MSDs include Repetitive Strain Injury, Musculoskeletal Injury, Cumulative Trauma Disorder, Occupational Overuse Syndrome, or Strain or Sprain.

Prevalence of Musculoskeletal Disorders

MSDs have had a major impact on Ontario's employers and employees. According to statistics from WSIB, in 2008 MSDs accounted for 43% of all lost time injuries within all Ontario workplaces. In 2008, MSDs were the number one cause of lost time injuries in all three sectors served by PSHSA, with over 9,000 MSD related lost time injuries occurring. Over a ten year period, MSDs had cost Ontario employers over 19 billion dollars in direct and indirect costs.

Musculoskeletal Disorder Hazards

MSD hazards are general classified into three categories; biomechanical hazards, additional hazards, and individual hazards.

Biomechanical Hazards

Also referred to as the primary risk factors, biomechanical risk factors are those which place a load (stress) upon structures of the musculoskeletal system (Marras, 2006). There are three biomechanical risk factors; high force,

awkward posture, and repetition. Any one of these hazards may lead to an MSD by themselves, however when two or more hazards are combined together, the risk for an MSD increases substantially.

High Force

Force is the amount of effort exerted by the muscles in order to complete a task. The greater the force that is required, the greater the level of stress placed on the musculoskeletal system. Some activities that can result in forces being applied include lifting, lowering, pushing, pulling, carrying, gripping, and pinching. Some of the factors that need to be considered with regards to force are that posture being used while applying the force, how often the force is applied, the weight of the object being handled, and the speed of the movement.

Awkward Posture

An awkward posture is any fixed or constrained body position that overloads muscles, tendons or joints. In general, the further away a joint gets from a relaxed, or neutral position, the greater the risk for an MSD. When a joint is moved further away from its neutral range, it requires more effort to achieve the same force. Generally, towards the end of a joint's range of motion muscles become either too short or too long and the ability to generate force is reduced. If muscles are repeatedly placed in these positions or held for prolonged periods of time they begin to fatigue and surrounding tissues become stressed, making them more susceptible to an MSD.

Repetition

A task is repetitive when similar exertions, actions, or movements are done often during a specific period of time. During repetitive tasks, the musculoskeletal system can begin to fatigue, if enough recovery time is not provided. As the musculoskeletal system begins to fatigue, it cannot tolerate as much stress. Even though the amount of force applied may not change during the tasks, an MSD may occur if the musculoskeletal system is too fatigued to handle the stress.

Additional Hazards

Additional hazards for MSDs include vibration, temperature, contact stress and work methods.

Vibration

There are primarily two types of vibration, whole-body and segmental. Whole-body vibration is typically transmitted through the feet or buttocks to the rest of the body. Segmental vibration, also referred to as local vibration, occurs when a particular segment of the body is exposed to vibration, such as the hands when holding a power tool.

Temperature

Working in either very cold or very hot environments can increase the risk for an MSD. In cold temperatures, the blood flow to the muscles and tissues is reduced. Cold can reduce the sensitivity in hands and fingers, requiring higher forces to grip objects. Working in hot or humid environments causes the body to increase blood flow to the surface of the skin. This allows the heat to radiate away and produce sweat. When the internal body temperature increases, the body's energy and fluid reserves can decrease, which may cause dehydration and muscle fatigue.

Contact Stress

Contact stress occurs when a part of the body comes in contact with hard, sharp surfaces or objects. The point of contact places a stress on the musculoskeletal system. Repeated or prolonged contact could result in inflamed tendons, obstructed blood flow and muscle fatigue (Putz-Anderson 1998).

Work Methods

Work methods refer to the way the work is done (technique or habits). Work needs to be appropriately taught, monitored and enforced for the protection of workers as a means to reduce exposure to hazards. Factors negatively affecting work method can include poor physical and mental status (fatigue from shift work), the lack of proper training in safe operating procedures or safe work practices, poor feedback given to workers, the absence of worker supervision, and peer pressure from co-workers to do the job incorrectly (e.g., too fast, not using assistive devices, etc.).

Individual Hazards

Certain attributes about an individual may also lead to an MSD. These can include age, body size, previous injuries, and genetic predisposition. These hazards are very difficult to control, which emphasizes the need to control the biomechanical and additional hazards even more.

Controlling Musculoskeletal Disorder Hazards

MSD hazards control is accomplished through ergonomics. Ergonomics is the scientific discipline concerned with understanding interactions between humans and other elements of a system to optimize human well-being and overall system performance (OHSCO, 2007). When controlling MSD hazards, the hierarchy of controls should be followed; MSD hazards should first be controlled at the source, then along the path, and finally at the worker.

At the Source

Controlling MSD hazards at the source is the most effective form of control. Controls at the source include redesigning a workstation to minimize reaching, building adjustability into a workstation so multiple people can use it, using equipment or machinery to eliminate lifting lowering, pushing and pulling, mechanizing highly repetitive tasks, and preventative maintenance of all equipment.

Along the Path

Controlling hazards along the path can help to reduce the risk of a hazard causing an MSD. Examples of controls along the path can include policy and procedures, job or task rotation, or training on proper techniques (such as safe lifting or client transfers).

At the Worker

Controlling MSD hazards at the worker is the least effective method to prevent MSDs. These types of controls typically involve personal protective equipment (PPE). Some forms of PPE may help to reduce the risk of MSDs; these can include shock absorbing gloves, gel knee pads, or insoles. Other forms of PPE, such as back belts or wrist splints, have not been shown to be effective in preventing MSDs for the average healthy adult (McGill, 2006, Sommerich, 2006).

General Musculoskeletal Disorder Prevention Tips

1. If possible, lower rather than lift

Lowering loads from a higher to a lower level uses gravity as an advantage. This may help to reduce stresses placed on the body.

2. Always use the proper lifting technique

Often, safe lifting training involves teaching the standard 'Bend at your Knees' technique. While this technique is effective for many lifting situations, other situations may require a 'Golfer's Lift' or a 'Two Person Lift'. Ensure everyone is trained on the appropriate techniques and when to use them.

3. Push rather than pull

Pushing provides a mechanical advantage, since an individual's body weight helps to move the object. Pushing also allows for better body positioning, reducing stresses on the musculoskeletal system.

4. Push or pull rather than carry

Using a cart to push or pull a load reduces stresses placed on the musculoskeletal system from carrying.

5. Work within the 'power zone'

The 'power zone' is typically considered the area between the shoulders and the knees. Doing work within this area maximizes the body's strength. Heavier objects should be stored in this area so that the body can more effectively handle them. Lighter objects may be able to be stored outside of the power zone.

6. Avoid awkward postures

Joints are strongest and in their most stable position when they are in a neutral position. Work should be designed so that most of it is done with neutral postures. Awkward posture, such as working over the shoulder, increases the risk for an MSD.

7. Build adjustability in the job

Having adjustability in the job allows every person to do the work in their most effective posture. It helps to ensure everyone can do work within their power zone, and helps to avoid awkward postures. It also has the advantage of allowing many different people to safely do the same job!

Resources Available from PSHSA

Fast Facts (*free to download at www.pshsa.ca*)

Preventing Musculoskeletal Disorders in the Laboratory Environment

Participatory Ergonomics

Ergonomic Program Implementation Continuum

Repetitive Strain Injury: Could You Please Repeat That ... Again and Again and Again?

How Does My Back Work?

How Much Can You Lift?

Ergonomic Tips for Dietary Staff

Ergonomic Guidelines for Laundry Workers, Supervisors and Managers

Ergonomic Tips for Resident/Patient Bathrooms

Building a Safe Client Handling Program

DVD

Ergonomics in Healthcare: A Fitting Solution

OHSCO Resource Manuals

Part 1: Getting Started

Part 2: Resource Manual

Part 3: MSD Prevention Toolboxes

Ergonomic Services Available from PSHSA

Ergonomic Assessments:

- To identify risk factors, determine the level of risk present in a job and provide suggestions to minimize the risk of injury
- May be needed if:
 - A specific job has a rate of MSD
 - Concerns over potential risk factors
 - New work station design
 - Assessing the risk of new equipment

Physical Demands Description

- An in-depth description of the physical demands and environmental conditions associated with a job being performed.
- Often referred to as Physical Demands Analysis (PDA).
- PDDs have many uses including:
 - Identifying jobs that may require a more detailed ergonomic assessment
 - Determining the skills and qualifications necessary to complete a job
 - Acting as the starting point for developing a job rotation schedule
 - An invaluable tool for the Early and Safe Return to Work process

Coefficient of Friction Evaluation

- Measurement of resistance to motion that occurs between two bodies
- This type of assessment can be used to determine:
 - Whether current flooring provides an adequate level of friction
 - If different cleaning solutions used on the floor can create a slip hazard.
 - The slip resistance of new flooring prior to installation, to ensure the new flooring will be adequate
 - Whether or not an organization requires a safe footwear policy based on the hazards in the workplace.

For more information, or to access our ergonomic services, please contact your PSHSA consultant.

Training

The following training program can be offered at your location, or attend at regional sessions offered periodically across the province. To book a session at your location, please contact your PSHSA consultant.

Musculoskeletal Disorders (MSD) Awareness and Prevention

Musculoskeletal disorders (MSD) result from excessive strain on the body and are the number one workplace injury in the province of Ontario, costing billions of dollars. This full-day workshop overviews major risks that lead to MSDs, common control strategies, the value of a participatory approach and the steps to develop a comprehensive MSD prevention program for your workplace. It also introduces tools to help you develop your program. Topics covered include:

- The major risks that lead to MSD and common control strategies
- The value of the participatory approach, where workers are involved in the recognition, assess and control of risks
- The steps to developing a comprehensive MSD prevention program for your workplace

EPIC Ergonomic Program Implementation Continuum (EPIC)

The EPIC program depends on a participatory ergonomics approach to address ergonomic hazards as well as the prevention of both client and worker slips, trips and falls (STF). The EPIC framework encourages the transfer of knowledge in injury prevention and provides the organization with the necessary skill and ability to systematically assess and control MSD and STF hazards. With EPIC, organizations do not wait for MSD signs or symptoms before investigating and intervening. A proactive approach is fundamental and critical to the program's success as the organization considers facility design, physical demands descriptions, workplace assessment and MSD/STF prevention training.

To learn more, review the EPIC Fast Facts, free to download from www.pshsa.ca, or contact your PSHSA consultant.