

# UNDERSTANDING & CONTROLLING ERGONOMIC RISK FACTORS

## INTRODUCTION

Ergonomics can be complicated, but this program provides a simple explanation all employees can understand. Ergonomic controls are used in almost all workplaces to prevent musculoskeletal disorders (MSDs), often called cumulative trauma disorders or repetitive stress injuries. Workers often ignore the signs and symptoms of these disorders until a chronic condition has developed and they often don't know the measures they can take to prevent them. That's the purpose of this program—to explain what ergonomics and musculoskeletal disorders are and the measures your organization takes to control ergonomic risk factors. More importantly, the program reviews work control practices that workers can follow to prevent musculoskeletal injuries and illnesses. It also features both office and industrial settings to illustrate important lessons about ergonomics.

Topics include musculoskeletal disorders and their signs/symptoms, the ergonomics program, ergonomic controls, reporting symptoms of musculoskeletal disorders and lifting and carrying loads.

## PROGRAM OUTLINE:

### WHAT IS ERGONOMICS?

- Simply put, ergonomics is the science of designing the job to fit the worker instead of physically forcing the worker's body to fit the job.
- By adapting tasks, workstations, tools and equipment to fit the worker, physical stress on a worker's body parts can be reduced, preventing many potentially serious and disabling musculoskeletal disorders.
- We all come in different shapes and sizes, so there is no standard workstation setup that will provide a good fit for everyone. Configuring the work area to fit an employee's body is a big part of ergonomics.

### MUSCULOSKELETAL DISORDERS

- To better understand how to prevent ergonomic injuries, you need to understand what musculoskeletal disorders, or MSDs, are, what causes them and their signs and symptoms.
- MSDs are often called cumulative stress disorders or repetitive stress injuries. Other names include repeated trauma and occupational overexertion syndrome. All of these terms refer to the same type of illnesses and injuries.
- Most frequently involving the arms or the back, these disorders affect the soft tissues of the body, including muscles, tendons, ligaments, joints and cartilage. They can also impact the central nervous system.
- Here are some signs and symptoms that you should be aware of: abnormal formation of the extremities, such as curled fingers or toes, restricted movement in the joints of your knees, elbows, wrists, neck or shoulders, difficulty in holding and lifting objects due to decreased grip strength, fingers or toes turning white, pain, numbness, tingling, burning or other sensations in various body parts and loss of muscle function or control, which can cause the affected area to feel heavy or clumsy.
- Ergonomic risk factors that can lead to musculoskeletal disorders include excessive repetition of body movements, awkward or unchanging postures, exerting too much force, vibration, contact stress and cold temperatures.

### THE ERGONOMICS PROGRAM

- Organizations that have job tasks and work areas where these factors could adversely affect the health of employees have a plan for reducing, eliminating or controlling them. Most companies call this their Ergonomics Program.
- Controlling ergonomic hazards begins with identifying the jobs that have risk factors associated with them. As part of the ergonomics program, the company has conducted a series of job hazard analyses on all jobs, operations and work activities where ergonomic risk factors are present in order to pinpoint specific problems.
- Be aware that a localized job hazard analysis will be performed when a new job task with risk factors has been introduced into the facility and when an employee has suffered a musculoskeletal disorder while performing a specific job.

- Many organizations encourage stretching as part of their ergonomics program. Just like an athlete before a big game, doing stretching exercises can enhance your body's flexibility and lessen the risk of a musculoskeletal injury.
- It only takes five to 10 minutes each day to perform a series of stretches that will make your muscles, tendons and ligaments more flexible, which in turn will increase the range of motion in your joints.

## **METHODS TO CONTROL ERGONOMIC RISK FACTORS**

- After identifying the ergonomic risk factors of each job, an organization generally uses three forms of controls to protect employees performing these tasks: engineering controls, administrative controls and personal protective equipment.

### ***Engineering Controls***

- Engineering controls are the most preferred and reliable approach for reducing the risk of ergonomic-related illnesses and injuries. These controls focus on modifying job tasks, workstations, tools and processes, taking into account the physical capabilities and limitations of workers.
- An example of engineering controls is improving employee workstations by adding height-adjustable workbenches or providing ergonomic-friendly office equipment that a worker can adjust to maintain a neutral posture and avoid awkward positions.
- Another example is supplying workers with mechanical lifting devices for transporting heavy objects to avoid strain and force exertion from manual lifting.

### ***Administrative Controls***

- Administrative controls are policies and practices introduced by management to reduce ergonomic risk factors, such as exertion, repetitive motion and awkward postures. While administrative controls do not eliminate workplace hazards, they can be effective when engineering controls aren't feasible.
- Examples include scheduling more breaks for strenuous jobs, rotating job tasks to reduce exertion and repetition and establishing more efficient job procedures.
- Another administrative control is training to help workers recognize ergonomic risk factors and learn the safe work practices that they can follow to prevent the development of MSDs.

### ***Personal Protective Equipment***

- Personal protective equipment, PPE, is another control that is provided to workers by the employer in an effort to reduce the risk of ergonomic problems. It is not designed to take the place of engineering or administrative controls, but rather serve as a barrier between the worker and hazard source.
- Examples of ergonomic PPE are gloves that reduce vibration from tools and equipment, thermal gloves that allow materials to be handled easily in cold conditions and kneepads or padding that reduces direct contact with hard, sharp or vibrating surfaces.

## **REPORTING SYMPTOMS OF MUSCULOSKELETAL DISORDERS**

- The real key to preventing workplace musculoskeletal disorders is you. By being able to recognize the symptoms of MSDs and then report them, and by following the work practice controls that thwart such illnesses and injuries.
- You are the critical factor in ensuring that your body doesn't develop a painful and disabling ailment that not only keeps you out of work, but could have a permanent adverse effect on your entire lifestyle.
- It is imperative that you report any symptoms of MSDs to the proper authority immediately. Because these disorders tend to occur gradually and cumulatively, you really can't be sure of the extent of a problem unless you have it checked out as soon as you notice it.

- When reporting these symptoms, you should give specific information such as what sensations you feel in the affected area, when the symptoms first appeared and if you were performing a specific task when you first noticed the symptoms.
- Be aware that neglecting to report your symptoms can lead to increased inflammation and the severity of the disorder. As the condition progresses, pain often radiates to other parts of the body, making the ailment more difficult to diagnose. Without proper treatment, a condition that could have healed easily can develop into a chronic injury.

### **WORK PRACTICE CONTROLS: Hands, Wrists & Fingers**

- Whether you work in an office environment or in an industrial setting, the essential elements in preventing MSDs are posture and body positioning.
- Maintaining neutral posture while working is crucial in reducing stress on body parts, especially when performing job tasks that are done repeatedly throughout your shift.
- To prevent carpal tunnel syndrome and other disorders of hands, wrists and fingers, it is important to keep your wrists in the neutral position whenever possible. Neutral posture for the wrist is 10 to 15 percent extension in any direction with the thumb to the side while typing or with the thumb up while using tools.
- Working with your wrist in any other position other than neutral puts stress on the tendons and ligaments and can lead to chronic problems. So never work with your wrist flexed up or down or shifted to the left or right.
- One common mistake workers make is taking awkward wrist positions when using hand and power tools. A common solution to this problem is using a ladder or stepstool to get your body in a position that allows you to maintain a neutral wrist posture when using tools.
- Also, be aware that tools that have unevenly distributed weights or are too heavy or bulky can cause your wrist to shift out of neutral, resulting in stress when used in extended periods.
- Working with hand and power tools can cause other ergonomic problems in the hands and wrists. Use tools with rounded handles. These are much more comfortable in your hand and cause less strain than those with sharp edges.
- To alleviate pressure on the palm, use long-handled tools that allow you to spread your entire palm to grip them.
- When gripping a tool, use a firm grip that allows you to control the tool, but don't grip it too tight. This puts unnecessary strain on your fingers, hand and wrist.
- When using power tools, a primary ergonomic concern is vibration. Prolonged use of vibrating tools can cause damage to the muscles, joints and nerves of the hands, fingers and arms and result in such disorders as hand/arm vibration syndrome and vibration white finger.
- Avoid using tools with excessive vibration. If you must use a tool that vibrates a great deal, take breaks or alternate work tasks to decrease exposure.
- Also, anti-vibration gloves are available that greatly reduce the stress on the hands and arms. Gloves can also keep your hands warm and dry. Cold and wet hands make the effects of vibration worse.
- No matter what type of tool you are using, make sure it is in good working condition before use. Defective tools are more difficult to work with and thus more likely to contribute to stress on your hands, wrists and fingers.

### **WORK PRACTICE CONTROLS: Arms & Shoulders**

- In addition to vibration, awkward positions of your arms can also lead to MSDs.
- To maintain a neutral position for your arms, keep your upper arms to the side and your wrists and forearms out at 90-degree angles. Avoid having to raise your arms directly forward or reaching backwards.

- One common mistake workers make is to overreach by extending an arm out fully with the elbow locked. This puts tremendous stress on the wrist, arm, elbow and shoulder and should be avoided at all costs.
- A common solution to this problem is to tailor your workstation to your physical dimensions so that tools and supplies are easily within reach.
- Remember, no two workers have the exact same body type, so there is no standard workstation set up that will provide a good fit for everyone.
- Position tools and work materials in front of your body whenever possible. This helps you avoid having to make awkward movements to reach them.
- If work materials can't be placed within easy reach, use a reach tool to retrieve them so you don't have to overextend your arm.
- Another way to make sure your arms stay in a neutral position is to adjust the work surface to the appropriate height. Be aware that this height will vary according to the type of work you are doing. If you are typing or working directly on the surface, the height should be higher than if you are handling large objects.
- Of course, many work surfaces are stationary and cannot be lowered or raised. When this is the case, you may have to raise or lower your chair to the proper height to maintain a neutral position.

#### **WORK PRACTICE CONTROLS: The Neck & Back**

- Adjusting the workstation to fit your body will also help keep your back and neck in neutral positions. Be aware that it is very important that you do everything possible to avoid back and neck injuries because they can be quite painful and cause permanent disability.
- Sitting in awkward positions in your chair can be very stressful on your back and over time can cause some serious and permanent spinal issues.
- To maintain neutral posture for your back, sit up straight so that your spine's natural shape and lumbar curve are supported by the backrest of the chair. Lumbar support pillows are available for chairs that don't offer enough support for the lumbar region.
- Adjust the height of your chair so that your feet rest flat on the floor and your knees are slightly more elevated than your hips. This alleviates the strain on your lower back.
- If your feet don't reach the floor, choose a footrest to support them that allows you to maintain neutral posture while sitting.
- Neutral posture for your head and neck is having them centered over your shoulders so you can look forward. To achieve this, you may have to adjust your workstation so that you can hold your head straight while the primary focus of your work is in front of you close to eye level.
- Awkward positions such as bending your neck forward or backward for long periods of time to see the work can strain both your neck and back. Twisting your neck to either side for long intervals can also cause neck and back problems.
- One common mistake workers often make is bending over repeatedly to pick up tools and supplies. This can cause unnecessary stress on your back.
- A common solution to this problem is to place these items on the work surface or keep them on racks or shelves positioned at or near the working level.
- Standing for long periods of time is both stressful and fatiguing to your back and the rest of your body. If you must stand for extended periods, use anti-fatigue mats to absorb the stress of standing on a hard surface.

- Using a footrest and switching your feet periodically will make standing work much more comfortable while relieving the stress on the discs of your back.

### **ERGONOMICS OF LIFTING & CARRYING LOADS**

- Lifting and carrying objects improperly can cause a multitude of problems that often lead to musculoskeletal disorders. It is imperative that you use proper lifting procedures to avoid back, shoulder and neck injuries.
- When lifting a load, use a staggered stance with one foot in front of the other, bend your knees and get as close to the load as possible. Get a good grip on the load and lift by using your legs to rise up. Lift smoothly without jerking and maintain the natural lumbar curve in your spine.
- Avoid lifting up the load with a twisting or side bend motion. Twisting your back with a raised load can be extremely damaging to your spine. Instead, move your feet in the direction in which you need to travel.
- Carry a load close to your body, using two hands to distribute the weight evenly. To set an object down, reverse the lifting process. Keep your back in a neutral posture and bend at the knees.
- If the load is too heavy or awkward to lift alone, don't risk injuring your back. Get help or use a mechanical lifting device such as a hand truck or dolly.

## **PREPARE FOR THE SAFETY MEETING**

Review each section of this Leader's Guide as well as the program. Here are a few suggestions for using the program:

Make everyone aware of the importance the company places on health and safety and how each person must be an active member of the safety team.

Introduce the program. Play it without interruption. Review the program content by presenting the information in the program outline.

Copy the review questions included in this Leader's Guide and ask each participant to complete them.

Make an attendance record and have each participant sign the form. Maintain the attendance record and each participant's test paper as written documentation of the training performed.

Here are some suggestions for preparing your video equipment and the room or area you use:

Check the room or area for quietness, adequate ventilation and temperature, lighting and unobstructed access.

Check the seating arrangement and the audiovisual equipment to ensure that all participants will be able to see and hear the program.

## **CONDUCTING THE PRESENTATION**

Begin the meeting by welcoming the participants. Introduce yourself and give each person the opportunity to become acquainted if there are new people joining the training session.

Explain that the primary purpose of the program is to explain what ergonomics and musculoskeletal disorders are and the measures your organization takes to control ergonomic risk factors as well as to review work control practices that workers can follow to prevent musculoskeletal injuries and illnesses.

Introduce the program. Play it without interruption. Review the program content by presenting the information in the program outline.

Lead discussions about specific ergonomic risk factors employees may encounter at your facility and what workers can do to prevent them from contributing to musculoskeletal disorders.

After watching the program, the viewer should be able to explain the following:

- How the company's ergonomic program and ergonomic controls work to help prevent MSDs;
- How and why to report symptoms of MSDS;
- Which work practice controls to follow for various body parts;
- How to lift and carry loads properly to reduce the risk of MSDs.

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**REVIEW QUIZ**

Name \_\_\_\_\_ Date \_\_\_\_\_

*Please provide answers to the following to show how well you understand the information presented during this program.*

1. An ergonomics program is a plan for reducing, eliminating or controlling ergonomic risk factors.
  - a. true
  - b. false
  
2. Which is the most preferred and reliable approach for reducing the risk of ergonomic related illnesses and injuries?
  - a. engineering controls
  - b. administrative controls
  - c. personal protective equipment
  
3. Administrative controls can be introduced to eliminate workplace hazards.
  - a. true
  - b. false
  
4. Personal protective equipment is not designed to take the place of engineering or administrative controls.
  - a. true
  - b. false
  
5. Neutral posture for the wrist is \_\_\_\_\_ extension in any direction.
  - a. 10 to 15 percent
  - b. 20 to 25 percent
  - c. 30 to 35 percent
  
6. To maintain a neutral position for your arms, keep your upper arms to the side and your wrists and forearms out at \_\_\_\_\_ angles.
  - a. 45 degree
  - b. 60 degree
  - c. 90 degree
  
7. When adjusting the height of your chair, your hips should be slightly more elevated than your knees.
  - a. true
  - b. false
  
8. Neutral posture for your head and neck is having them centered over your shoulders so you can look forward.
  - a. true
  - b. false
  
9. When carrying a load, the load should be held away from your body.
  - a. true
  - b. false
  
10. If a load is too heavy or awkward to lift alone, you should get help or use a mechanical lifting device such as a hand truck or dolly.
  - a. true
  - b. false

*ANSWERS TO THE REVIEW QUESTIONS*

1. a

2. a

3. b

4. a

5. a

6. c

7. b

8. a

9. b

10. a