Musculoskeletal Disorders in the Office

Meeting Objectives
To provide employees with an understanding of musculoskeletal disorders (MSD) and work-related risk factors that can contribute to an MSD. At the end of this training session, employees will be able to evaluate their own workspaces and begin to implement changes that can reduce their exposure to MSD-related risk factors. No matter what type of work an employee does, exposure to risk factors may increase the possibility of an MSD.

Suggested Materials to Have on Hand
If possible, conduct this meeting in an office work area so you can demonstrate the ergonomic risk factors that employees may currently be exposed to on a daily basis.

Introduction/Overview
MSDs are disorders or diseases of the nervous system or soft tissue.
Experts in ergonomics, the science of fitting the job to the worker, have found that most MSDs are caused or related to five workplace risk factors: repetition, force, awkward postures, contact stress, and vibration. Ergonomic experts have found that reducing an employee's exposure to these risk factors will reduce the potential for MSD-related injuries. Exposure to MSDs risk factors can be reduced by ergonomic engineering controls, administrative controls, and by the use of personal protective equipment (PPE).

The Occupational Safety and Health Administration (OSHA) have found that approximately 1.8 million workers in the United States report work-related MSDs each year. About one-third of those injuries, or 600,000 injuries, requires workers to take time off from work to recover from their injuries.

MSDs, when reported and treated early, can be repaired so workers can resume their normal jobs. However, MSDs that go untreated can cause irreversible, permanent damage.

OSHA Regulations
In November 2000, OSHA published its Ergonomics Program Standard (29 CFR 1910.900) that became effective: January 17, 2001. However, in March 2001, OSHA's Ergonomics Program Standard was repealed by Congress under the Congressional Review Act.

Although OSHA no longer has a formal ergonomics standard, enforcement actions may still be issued under the General Duty Clause.

Despite the lack of formal regulations, it still makes good financial sense for a business to seek out MSD risk factors and to take steps toward preventing employee exposure to those risk factors. In the long run, a company can save a considerable amount of money in workers' compensation, labor, training new employees, and other costs by reducing injuries that can take a long time to heal properly.

In addition, you are the only one who knows when you are experiencing pain and strain. And you're the one who's best able to determine what tasks, tools, and positions cause those symptoms. By being alert to problems, you help us identify injury causes—and solutions. That means you play an essential role in helping our company create a workplace in which you can work productively and comfortably.

Identifying Hazards

Musculoskeletal Disorders

An MSD is an injury or disorder of the nervous system or soft tissue such as muscles, tendons, ligaments, joints, cartilage, or blood vessels. Signs and symptoms of MSDs include pain or swelling in the hands, wrists, fingers, forearm, elbows, and joints. The feeling of the pain varies depending on the MSD and can be described as tightness, stiffness, soreness, burning, tingling, coldness, numbness, or general discomfort.

Let's take a look at some specific signs and symptoms of MSD-related injuries to specific body parts.

- Back and neck may experience shooting pain or stiffness.
- Shoulders may have pain, stiffness, or loss of mobility.
- Arms and legs may feel shooting or stabbing pains or numbness.
- Elbow or knee joints may experience pain, swelling, stiffness, or soreness.
- Hands and wrists may have a number of symptoms including general pain, swelling, tingling, numbness, coldness, burning sensation, or loss of strength or coordination.
- Fingers may feel loss of mobility, snapping or jerking movements, loss of strength, loss of feeling sensation, or severe pain.
- Thumbs may have pain at the base of the thumb.
- Feet and toes may experience tingling, numbness, coldness, stiffness, or a burning sensation.

Your co-workers may be displaying outward signs of an MSD-related injury if they show some of the following signs or symptoms:

- Swelling or inflammation of joints
- Vigorously shaking hands as if trying to get the circulation back
- Massaging hands, wrists, or arms
- Cradling arms
- Limping
- Walking stiffly may indicate a sore back

Some of the more common MSDs, their symptoms, and the typical causes of the MSD are listed as follows:

- *Carpal tunnel syndrome:* Compression of the median nerve, which provides sense of touch for fingers, where it passes through the wrist and into the hand. Usually the result of repetitive motion such as typing.
- *Tendinitis*: Tendon inflammation that occurs when a muscle/tendon is repeatedly overused.
- *Thoracic outlet syndrome:* Compression of nerves and blood vessels as they travel from the neck, under the collarbone, through the armpit, and down into the arm. Often attributed to repetitive arm extension and slouching forward.
- *De Quervain's disease:* Inflammation of the tendon sheath of the thumb which is usually caused by forceful gripping or twisting motions of the hands.
- *Trigger finger:* Tendon becomes locked in the sheath and attempts to move the finger causing snapping or jerking motions which is associated with using tools with hard handles.
- *Raynaud's syndrome:* Blood vessels of the hand are damaged from repeated exposure to vibration. Symptoms include tingling in fingers, pale and cold skin, and loss of control of fingers.
- *Rotator cuff syndrome:* Tendon and bursa in the shoulder become pinched when the arm is lifted up in the forward position. Repetition causes swelling and inflammation of the tendon and bursa.

- *Sciatica:* Pain down the leg traveling below the knee. Vertebrae discs put pressure on nerves caused by frequent bending or twisting or carrying loads at arm length.
- *Epicondylitis:* Often referred to as "tennis elbow" and often resulting from repetitive forearm and wrist activities. Symptoms include pain on the inside or outside of the elbow when gripping or turning items such as a doorknob.
- *Tenosynovitis:* Inflammation or injury to the synovial sheath surrounding the tendon. Usually the result of excessive motion.

Risk factors
The following five risk factors are the major contributors to MSD-related injuries and illnesses. Prolonged exposure to one or more of these risk factors in your job puts you at risk of an MSD.

Repetition: Doing the same motion over and over for long periods of each day which includes daily and lengthy use of a keyboard or mouse.

Force: Constant lifting or pushing and pulling.

Awkward postures: Working with your back or neck bent down or twisted, or working with your hands above your head which includes extending arms to type or sitting forward with hunched shoulders.

Contact stress: Using your hand or knee as a hammer. Contact with a hard surface such as leaning against a counter or continually pounding a stapler with your palm.

Vibration: Using vibrating tools or equipment such as powered saws.
Notice how the MSDs mentioned previously were all caused in some way by one or more of the MSD risk factors. Reducing employees' exposure to risk factors will reduce their potential for suffering from an MSD-related injury.

- Rotator cuff syndrome—Repetition
- Thoracic outlet syndrome—Posture
- De Quervain's disease—Forceful grip
- Trigger finger—Contact stress
- Raynaud's syndrome—Vibration

Protection against Hazards

Ergonomic Posture for a Computer User
One of the best ways to reduce your exposure to MSD risk factors is to adjust your work space or workstation so that you can maintain a neutral posture as much as possible while doing your work.
Neutral posture should include the following elements:

- Your head should be vertical and facing forward. Holding your head off-balance (leaning it to the side) puts stress on the neck and shoulders. Put the work (i.e., notes that need to be typed) in front of you to minimize head rotation that is repetitive or of long duration. Extended periods of tilting, turning, or bowing your head puts strain on your neck.
- Straight back posture. Extended periods of twisting to the side or bending forward puts strain on your back.
- Shoulders should be in a neutral position with arms tucked close to your body and hanging relaxed. Shoulders should not be raised or hunched; elbows should be positioned comfortably below the shoulders and not extended outward from the body or forward or backward from your shoulders. Working with your

arms over your head, extended forward, or out to the side puts strain on your shoulders and elbows.

- Forearms should be parallel to the ground and wrists in a straight line with your forearms. Hands flexed up or down, bent to the sides, or twisted for extended periods puts strain on nerves and soft tissue in your wrists.
- Sit with thighs parallel to the floor, knees bent about 90 degrees, and feet resting comfortably flat on the floor or on a footrest.

Remember, working with the correct posture does not mean sitting like a stiff robot. Rather, your body should be in a relaxed and comfortable position.

Designing an Ergonomic Computer Workstation

An ergonomically correct work space has some of the following components and will help workers maintain the neutral posture while working.

- The furniture is adjustable to fit the size of each worker.
- A worker can maintain neutral position and avoid awkward postures and extended reaches.
- A variety of working positions is available to avoid prolonged static postures.
- There is adequate room for a full range of body motion.
- There is easy access to all necessary tools and equipment.
- Work items are in front of the worker and within easy reach.
    - An ergonomic chair should have a comfortable and wide seat. The length of your seat should allow you to put your back against the lumbar support while the front edge of the seat is about an inch from the back of your knees. The chair should have a curved front edge so that it does not put pressure on the back of your thighs. The height should allow your feet to rest flat on the floor. The backrest should have an adjustable lumbar support. Armrests should be broad and cushioned and should properly support your shoulders, elbows, and wrists.
    - The computer monitor should be placed directly in front of you and facing you. Your neck should not be twisted or turned to look at the monitor. When the monitor is at the proper height, you should not have to tilt your head up or bend your neck down to see it. After being seated properly, the monitor should be placed such that your eyes are aligned with a point 2 to 3 inches below the top of the screen. Tilt the monitor back just slightly to help prevent glare. The monitor should be located an arm's length from you. When you sit back in your chair and raise your arms, your fingers should touch the screen.
    - The keyboard must allow you to place your hands/wrists in the neutral position with elbows close to your body, wrists flat and in line with your forearms, and wrists not angled up or turned in or out. The keyboard must be height adjustable, in a tilting keyboard tray, detachable from the computer monitor, and the keystroke pressure should be comfortable. Do not rest your wrists on a wrist rest when typing. This puts pressure on your carpal tunnel. You should use the wrist rest only during a typing pause.
    - Control the mouse movement from your elbow. Keep your wrist straight and neutral. To position the mouse, sit back in your chair and relax your elbows, lift your mouse hand up, pivoting at your elbow, until your hand is just above elbow level; this is where your mouse should be located. Use an adjustable mouse platform to obtain this position. Remember, you should not have to reach or extend your arm or body to use the mouse. Wrist rests and overly cushioned armrests often prevent the user from pivoting at the elbow, so the mouse is used by bending and twisting the wrist.
    - The design of laptop computers violates basic ergonomic principles for a computer workstation in

that the keyboard and screen should be separated. The laptop can be positioned to provide either good neck/head posture or good hand/wrist posture, but not both. Occasional laptop users should sacrifice neck posture (larger muscles) rather than wrist posture. Sit back in a comfortable chair, position laptop so you have a natural wrist position, and angle the screen to avoid neck strain as much as possible. Full-time laptop users (laptop used as main computer) should position the screen as they would a normal workstation monitor and use a separate keyboard and mouse.

Safety Procedures

Ergonomic Work Practices

Work practices and operating procedures can be used to reduce the duration, frequency, or severity of a worker's exposure to ergonomic risk factors.

Job design and work methods should incorporate ergonomic practices and provide relief from:

- Repetitive motions
- Static and awkward postures
- Excessive forceful exertions
- Contact stress
- Vibration
- Muscular fatigue

Job rotation can be used to prevent injury by moving workers in and out of jobs that use different muscle-tendon groups.

Workers can use recovery pauses to help prevent eyestrain, headache, and neck, back, shoulder, arm, or hand pain. Perform activities that involve different muscle groups during these recovery pauses. Take a few minutes to stretch and flex the neck, back, arm, hand, and leg muscles.

Exercises and Breaks

The following activities are geared toward office workers at computer workstations.

Hand Stretches

- Make a fist, then extend and spread your fingers.

Wrist and Forearm Stretches

- Hold arms out in front of your body and bend hands up and down.
- Palms together with fingers pointed upward and elbows pointed out, bring your hands down until you feel the stretch.

Shoulder Stretches

- Shrug your shoulders; roll your shoulders forward and back.
- With elbows out, move your arms back to bring your shoulder blades together.
- Reach your arms overhead and stretch; bend from side to side.

Neck Stretches

- Rotate your head up and down.
- Turn your head from side to side.
- Tilt your head toward each shoulder.

Back and Arm Stretches

- Put your hands behind your head and pinch your shoulder blades together.
- Bend forward in your chair and touch the floor.

- Grasp your shin or knee and pull your knee toward your chest (do while sitting).
- Stand up, place your hands on your hips and bend backwards.

Workers who are doing repetitive jobs should also use minibreaks and rest breaks.

- Eye breaks—Every 15 minutes look away from the monitor and focus on something at a distance of about 20 feet for a minute or so. This allows your eye muscles to relax. Also, blink rapidly for a few seconds to refresh the eye's surface.
- Minibreak—Typing is typically done in short bursts. Between those bursts of activity, allow your hands to relax in a flat and straight posture. A minibreak is not a break from work; rather it is a break from using the typing or "mousing" muscles. Make a phone call or file some documents.
- Rest breaks—Take a short rest break every 30 to 60 minutes. Stand up and get a drink of water, make some photocopies, etc. Just get away from your computer workstation for a couple of minutes.

Report MSD Symptoms Immediately

- Report any MSD signs or symptoms immediately.
- Follow your company's reporting procedures.
- Be sure your company is aware of the risk factors of your job.
- Ask about medical treatment if the signs or symptoms persist or get worse.

Suggested Discussion Questions

1. Do you think that you are exposed to the risk factor repetition on your job?
2. Do you think that you are exposed to the risk factor force on your job?
3. Do you think that you are exposed to the risk factor awkward posture on your job?
4. Do you think that you are exposed to the risk factor contact stress on your job?
5. Do you think that you are exposed to the risk factor vibration on your job?
6. Describe some of the signs or symptoms that you might experience if you had an MSD-related injury in your hands.
7. How should your neck and back be positioned when working in the neutral posture?
8. Describe some of the things to consider when engineering a computer workstation.
9. How can "work practices" reduce an employee's exposure to risk factors?

Wrap-Up

- Learn about MSDs, the risk factors, and the signs and symptoms.
- Report symptoms immediately according to your company policy.
- Evaluate your own workstation for risk factors.
- Be aware of your working habits and adjust them as necessary.
- Arrange your workstation to reduce stretching, twisting, reaching, and awkward postures.
- Ask your supervisor or safety coordinator if you have any questions.

Sample Handout

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