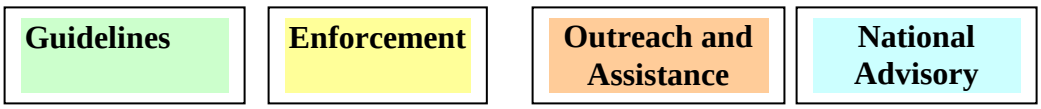
Ergonomics in General Industry

- Any job requires physical movement
- Some tasks may be repetitious and may require you to stand or sit for extended periods
- Jobs in the industrial environment can be physically demanding
- You may be required to lift, push, pull and handle heavy loads

OSHA has a four-pronged comprehensive approach to ergonomics designed to quickly and effectively address musculoskeletal disorders (MSDs) in the workplace. The four segments of OSHA's strategy for reducing injuries and illnesses from MSDs in the workplace are:



Guidelines, OSHA will develop industry or task specific guidelines for a number of industries based on current incident rates and available information about effective and feasible solutions.

Enforcement, OSHA will conduct inspections for ergonomic hazards and issue citations under the General Duty Clause and issue ergonomic hazard alert letters where appropriate.

Outreach and Assistance, OSHA will provide assistance to businesses, particularly small businesses, and help them proactively address ergonomic issues in the workplace.

National Advisory Committee, OSHA will charter an advisory committee that will be authorized to, among other things, identify gaps in research to the application of ergonomics and ergonomic principles in the workplace.

Introduction

- Each person has physical limits or a "Comfort Zone" of activities that he or she can tolerate without developing lingering symptoms
- Preventing work-related musculoskeletal problems rests on an ergonomically sound work environment, good work practices, and employee awareness.
- This training will present common risk factors and methods to prevent musculoskeletal injuries.

This training is intended to assist you to be able to:

- Identify the signs and symptoms of musculoskeletal disorders
- Recognize workplace risk factors for musculoskeletal disorders

- Identify general methods for controlling these risk factors

MSD's Signs and Symptoms:
Musculoskeletal disorders (MSD's) are caused by excessive and repeated physical stress on the hands, wrists, elbows, shoulders, neck and or back.

Common MSD's include:

Carpal Tunnel syndrome, Tendonitis and lower back pain.



- Signs and symptoms include:
- Decreased grip strength
- Reduced range of motion
- Loss of muscle function
- An inability to do every day tasks
- Painful joints
- Pain in wrists, shoulders, forearms, knees
- Pain, tingling or numbness in hands or feet
- Fingers or toes turning white
- Shooting paints in arms or legs
- Back or neck pain
- Burning sensations
- Heaviness
- Weakness or clumsiness in hands; dropping things



Ergonomics Program

Ergonomics is the scientific study of human work

- The goal of ergonomics is to reduce work-related musculoskeletal disorders by adapting the work to fir the person, instead of forcing the person to adapt to the work.
- Following ergonomic principals, helps reduce stress and eliminate many potential injuries and disorders associated with the overuse of muscles, bad posture, and repeated tasks.
- The Employer can accomplished this by designing tasks, workspaces, controls, displays, tools, lighting, and equipment to fit the employee's physical capabilities and limitations

According to statistics, the percentage of musculoskeletal disorders (sprains, strains and tears) that resulted in days away from work is 75 %.

If MSD signs and symptoms are not reported early, permanent disability may result.
The employee must report signs and symptoms right away to avoid long-term problems.

When reporting be prepared to document or tell:

- When the symptoms started, how long ago?
- How it feels
- Where it hurts
- When the pain occurs
- How long the pain lasts
- What motions or activities cause the pain and or symptoms

Risk Factors
Risk factors are conditions that can increase the risk of an injury such as:

- Repetitive, forceful, or prolonged exertions of the hands.
- Frequent or heavy lifting, pushing, pilling or carrying of heavy objects.
- Prolonged awkward postures
- Vibration
- Jobs or working conditions that combine risk factors will increase the risk for musculoskeletal problems
- Your level of risk depends on how long you are exposed to these conditions, how often you are exposed, and your level of exposure

Common Risk Factors

Be aware of common contributing conditions within your industry or job classifications. If other companies in the same industry have ergonomic-related problems, then it is possible these potential problems are also your concern. Obtain information from others in your industry: to see what problems others have experienced in their operations and to gain a better understanding of potential problems that may exist in your workplace.

Your employer has evaluated the workplace to identify jobs and activities that may increase the likelihood of MSD's

- Common risk factors include:
- Repetitive motions
- Awkward posture
- Standing or sustained exertions
- Material handling and lifting
- Mechanical contact stress
- Forceful exertions
- Hand-arm vibration






Other Risk Factors

- Home and off-the-job activities may also produce stresses on the body similar to those at work
- Your body does not know which symptoms are related to work activities and which are related to home or recreation activities - the two add up, and one is not necessarily worse than the other
- Being out of shape and underlying medical conditio0ns can also contribute to symptoms







According to the Department of Labor Statistics, the "BACK" was involved in 24 % of all occupational injuries and illnesses.

Prevention

- Prevention is the most important strategy for dealing with work-related musculoskeletal disorders
- To keep work-related symptoms from recurring, something in your work environment must improve
- Hazard prevention and control is part of the ergonomics program
- Changes can be made so that jobs, workstations, tools and the environment better fir the worker

Engineering Controls

- Engineering controls involve making changes to workstations, tools or equipment used on the job, or changing the way a job is done to avoid work-related musculoskeletal hazards
- These controls are preferred over all others, because they make permanent changes that eliminate hazards at the source

Engineering Controls include:

- Workstation design
- Work methods design
- Tool and equipment design
- Product design

Work Practice Controls

- Work practice controls may also be employed
- Work practice controls are procedures for safe and proper work that are used to reduce the duration, frequency or severity of exposure to a hazard
- Examples include scheduled rest breaks, job rotation and job design
- If the hazards cannot be eliminated at the source, safe ergonomic work practices should be utilized

Avoid Repetition

- Recognizing risk factors and knowing basic guidelines to reduce musculoskeletal injury is critical
- In this section, common causes of injury will be presented along with methods to reduce your risk of musculoskeletal injury
- Repeating the same motions over and over places stress on the joints, muscles and tendons
- The severity of the risk depends on how often the action is repeated, the number of muscles involved, and the required force

To counteract the effects of repetitive tasks during the day:

- Take mini breaks for a few seconds or minutes when there is an opportunity
- Rest and stretch your muscles

Awkward postures

Prolonged static or awkward postures can rapidly cause fatigue

- Awkward postures include repeated or prolonged:
    - Reaching
    - Twisting
    - Bending
    - Kneeling
    - Working overhead with your hands and arms
    - Holding fixed positions

Neutral Postures

- Work should be done so neutral postures are maintained, stoops and reaches are avoided, and time working overhead is minimized
- As you work, your back should be straight
- Your shoulders should not slouch down or be raised
- Try to position yourself at your work so that your arms do not have to reach above shoulder height
- Keep work at a comfortable height
- If you need to, either lower your workspace or stand on something so that your arms will be down and in front of your body

Positions to Avoid

- Avoid twisting your lower back when reaching
- Minimize bending movements when possible
- When bending, bend at your knees rather than your back

Avoid Overreaching

- If you must reach up to a high level, get something firm to stand on, such as a stepstool
- Your most frequent task motions should be in front of your body and within a comfortable arm's reach

Preventative Maintenance
Recognizing risk factors is the first step in the prevention of musculoskeletal injury





Standing

- Standing on hard floors for long periods can fatigue the back and leg muscles
- To reduce muscle fatigue and improve circulation, remember to take breaks and stretch periodically
- Wear comfortable and supportive shoes (low heels)
- Surfaces on which people stand for long periods should be designed to prevent slipping and provide adequate traction and comfort
- Anti-fatigue floor mats, sit-stand stools, and footrests can help make you more comfortable

Workspace Layout

Maximize the efficiency of your workspace layout

Workspace layout and arrangement should allow:

- Adjustability to fit each worker's size
- Neutral posture and ease of motion and reach
- A variety of working positions to avoid static postures
- Full range of motion and adequate leg room

- Adequate spare for and access to all necessary tools and equipment
- Frequently used work items to be within arms reach
- A full field of view - nothing should obscure your path of sight

Examples:
In a packing operation, boxes being packed with parts could be placed at waist height in front of the worker, rather than behind, below or on an overhead shelf.

Material Handling and Lifting

- Your job may require you to lift boxes or other heavy objects
- Material handling often involves lifting, carrying and lowering objects
- Lifting, Carrying and lowering objects have the potential to strain your back, arms and shoulders

Plan your lift

- It is important to plan your lift in advance
- Think about the weight of the object you will be moving and the distance you will be moving it
- Consider whether it is bulky, will you need help; are there any potential hazards that can be eliminated?






Properly Positioning Yourself Lifting and Setting down

- Align yourself in front of the load with your feet straddling the load, place one foot slightly in front of the other one for balance
- Slowly Squat down by bending your knees, not your back
- Using both hands, firmly grip the load and bring it as close to your body as you can. This will help distribute the weight evenly over your feet and make moving the object easier.
- Once the load is closer to your body, slowly straighten out your legs until you are standing upright
- Make sure the load is not blocking your vision as you move to your destination
- If you need to turn to the side do so by moving your feet around and not by twisting from your waist'
- When you have reached your destination, it is equally important that the load you are carrying be set down correctly

- By reversing the lift lifting procedures, you can reduce the strain on your back and stomach muscles
- If you set your load down on the ground, squat down by bending your knees and position the load out in front of you
- If the load is too heavy, bulky or awkward for you to lift alone, find a friend or co-worker to assist in lifting and carrying the object
- If possible break the load down in smaller increments
- If necessary use a cart or dolly to help move objects or if a motorized lift is present ask for assistance with having it moved for you

Always look for ways and means to simplify the process and take the option that exerts the least amount of physical force from you, your arms, back and legs.

Contact Stress

- Contact stress is another cause of musculoskeletal injury
- Nerves, tendons and blood vessels can be damaged by exposure to hard or sharp edges, such as a table edge
- Move or adjust equipment so that you do not touch the edge
- Placing padding on edges will minimize contact

Example:
When packing boxes, the position of the box could be changed so a worker does not have to contact a sharp table edge while placing the contents into the box

Using Hand Tools

- When using hand tools, proper selection and usage is important
- Take extra care to avoid twisting, vibration, static muscle loading, and pressure on tissues and joints
- You should select tools just heavy enough to accomplish the task
- The size of the tool handle affects the amount of force exerted with out straining the muscles and tendons
- A handle that is too large or too small requires more force to accomplish the same amount of work as a tool with a correctly sized handle for the job at hand
- Maintain straight wrists and avoid bending or rotating your wrists
- Using the wrong tool for the job can result in having to use unnecessary force
- The greater the effort to maintain control of a hand tool, the higher the potential for injury
- A sharp knife requires less force in cutting than a dull knife

Use Proper Tools and Follow Rules of Use

- Whenever possible, select tools that use a full-handled power grip rather than a precision finger grip
- Avoid sharp edges and pinch points
- Select tools with large switches that can be operated even when gloves are not worn
- Avoid repetitive trigger-finger actions
- Select tools with large switches that can be operated with all four fingers
- If your job involves the frequent use of hand-tools and you experience numbing or dull pain in your hands or forearms, contact your supervisor
- You may be experiencing early signs of musculoskeletal injury
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Vibration

- Operating vibration tools and equipment such as sanders, grinders, chippers, routers, drills, saws, jackhammers, and other vibration equipment can lead to nerve damage.
- Take mini breaks for a few seconds or minutes when there is an opportunity
- Rest stretch muscles, and exercise and stretch the body parts under stress

Reduce Vibration

The following recommendations can help reduce the likelihood of developing hand-arm vibration syndromes:

- Select power tools with anti-vibration properties
- Use hand coatings that suppress vibrations
- Keep power tools balanced and lubricated to minimize vibration
- Use vibration attenuation gloves

Other Factors

- It is important to warm up and cool down before and after work, just as an athlete does
- Stretching the hands, shoulders and back can be very helpful
- Keep your body warm

- If you work in a cold environment, wear proper clothing to keep you warm
- Make sure your clothing does not restrict movement or cut off circulation




PPE

- Personal Protective Equipment (PPE) may help reduce hazards until other controls can be put into place, or to supplement existing controls
- Gloves can protect the hands from injury or cold, but they also may reduce dexterity and increase grip force
- Wear the right size and type of gloves (the wrong type or ill fitting gloves may cause you to use excessive force to hold objects)



Glove Selection

When choosing gloves, consider these factors:

- Gloves should be small enough to minimize wrinkling or slipping but large enough so they do not hinder circulation
- Padding or insulation can add protection
- Texturing can improve your grip
- If chemical resistance is not a concern, the material should be breathable so perspiration is not trapped



Footwear and Anti-fatigue insoles

- Shoes with solid support, flex at the ball of the foot and adequate padding will maintain foot support and provide shock absorption
- Shoes with non-skid soles are also important, particularly where surfaces are potentially slippery
- Anti-fatigue insoles can give relief from musculoskeletal fatigue that develops from prolonged standing and walking on hard floor surfaces
- Anti-fatigue insoles are especially appropriate when anit0fatigue floor mats cannot be used because of housekeeping needs, the size of the area to be covered, or tripping hazards





Kneepads and Back Belts

- Kneepads can be used to avoid prolonged contact with hare or sharp surfaces
- Kneepads should be comfortable and large enough to cover the entire knee, be padded, and snug enough to fit well but not so tight that they impede circulation
- The effectiveness of back belts in reducing the risk of back injury remains unproven
- Back belts do not permit you to lift more than you can safely handle
- Back belts and wrist splints are not considered PPE and should only be used upon the advice of a qualified health care practitioner

Final notes:

- Prevention is the key to reducing musculoskeletal injuries
- Recognize the hazards and that the appropriate steps each day to reduce exposure and symptoms
- Your awareness of ergonomics will impact your comfort, health and productivity