Industrial Ergonomics

Most people have had occasional aches or pain from performing work activities. Many have experienced acute back pain or numbness and tingling in their hands. These symptoms are commonly due to ergonomic factors.

Ergonomics Overview

Ergonomics is the study of people's comfort and efficiency in their working environment. The goal of ergonomics is to prevent and reduce work-related injuries and chronic, painful conditions by adapting work to fit the person instead of forcing the person to adapt to the work. Ergonomics offers some general principles that can help anyone but should also be customized to meet individual needs.

The term **musculoskeletal** refers to the muscles and skeleton, including soft tissues, muscles, nerves, bones and connecting tissues, like tendons and ligaments. Musculoskeletal damage often occurs gradually. Damage and pain can begin subtly and get much worse over time. The pain can be chronic or persistent.

There are many different terms for **musculoskeletal damage,** such as musculoskeletal disorder (MSD), repetitive motion injury (RMI), repetitive strain injury (RSI) and cumulative trauma disorder (CTD). You may also hear about specific musculoskeletal damage diagnoses, such as tendonitis or carpal tunnel syndrome. Ergonomic stress is a cause or contributing cause for all these conditions.

To use ergonomics at work, you must recognize potential problems, take action to prevent problems, use ergonomic work practices and watch out for each other.

Recognizing Potential Problems

Risk factors are conditions that cause ergonomic stress and can increase the risk of musculoskeletal damage. Common examples of risk factors are:

- Repetition (same motion over and over)
- Forceful motion (using excessive force or effort to perform a task)
- Stationary positions (staying in one position for too long)
- Awkward posture (bending joints awkwardly or for a prolonged time)
- Contact stress (direct pressure on the body against a surface or edge)
- Temperature (extreme heat or cold)
- Vibration (restricted blood supply due to vibrating equipment)
- Stress (fast pace, inadequate breaks, monotony and poor organization)

Risk factors can occur at work and at home. Some tasks involve multiple risk factors. Combining risk factors increases the risk for musculoskeletal damage. The level of risk for musculoskeletal damage depends on the length of exposure to risk factors, frequency of exposure to risk factors, intensity of exposure to risk factors and physical condition and capabilities of the person.

Identifying symptoms early gives you an opportunity to heal and to make ergonomic adjustments before the damage gets worse. Symptoms of musculoskeletal damage include:

- Decreased grip strength, range of motion and muscle function
- Pain, stiffness and burning sensations, especially in the joints and extremities
- Numbness, tingling and blanching (white fingers or toes)
- Swelling and inflammation

Minor musculoskeletal injuries should heal with adequate rest, over-the-counter medications, hot/cold therapy and gentle stretching and strengthening exercises. Seek medical attention if severe pain occurs after a sudden injury or if pain interferes with your ability to perform daily activities.

Prevention

To avoid musculoskeletal damage, exercise regularly and stretch at least daily; avoid smoking, which increases inflammation; stay hydrated; eat a healthy, non-inflammatory diet; rest injured muscles and joints; and wear comfortable clothing that does not restrict movement or circulation.

Before you begin working, consider your tasks to see if there are things you can do to make work easier:

- Adjust work to a comfortable height, if possible
- Make sure frequently used tools and materials are easy to reach
- Ensure adequate line-of-sight and lighting
- Check to ensure clearance for full range of motion

Before you perform any strenuous activity, warm up by exercising gently, such as by briskly walking for 5 to 10 minutes. After you warm up, stretch to improve flexibility and range of motion. After strenuous activity, cool down by gently exercising again, such as by walking slowly for 5 to 10 minutes. Stretch again after you cool down. If you experience pain while stretching, report it.

Practices

Your supervisor can help you learn about specific ergonomic practices you will need for your tasks, such as lifting techniques, workstation setup and more. One tip that applies to all risk factors is to **take breaks** to relieve the strain on your body.

To avoid **repetition**, break up repetitive tasks with other tasks, use job rotations (multiple workers taking turns) and automate and mechanize tasks, if possible.

For tasks that involve **forceful motion**, use equipment that applies force for you, team lifts and material handling equipment.

When work involves **stationary positions**, use anti-fatigue insoles, shoes or mats; rotate tasks/jobs; and change positions (for example, alternate sitting/standing or use footrests).

To avoid **awkward postures**, avoid bending or twisting at the waist, adjust workstation height (if possible), use reaching tools and assign waist-level places for frequently used items.

To reduce **contact stress**, adjust equipment and desks so that you don't touch edges, pad surfaces and edges, and wear pads such as knee or shoulder pads.

To maintain comfortable **temperatures**, wear warm/cool clothing, choose appropriate gloves and protective equipment, and wear sweat bands and kerchiefs to keep sweat from eyes.

If you use tools that create **vibration**, work in shorter time segments and wear appropriate gloves.

To reduce **work stress**, adjust line and equipment speeds to a comfortable pace (if applicable), allow adjustment time for new/changed work and after absences, and report concerns.

Note: Gloves that are too tight can restrict circulation. Gloves that are too loose may require a tighter grip or may slip or be caught in rotating parts. See your supervisor if you have questions about glove selection and fit.

Responsibilities

To reduce the impact of ergonomic injuries, you should recognize potential problems; use prevention techniques like warming up and stretching; report ideas, concerns and injuries; and watch out for others (offer help and encourage reporting).

To reduce the impact of ergonomic injuries, your employer should create and provide an ergonomics program; assess, address and control ergonomic issues; respond to reporting; provide training, equipment and tools; and implement healthcare procedures.

Early detection and treatment are the only ways to prevent musculoskeletal damage from becoming much worse over time. Report symptoms right away.

When reporting be prepared to describe when the symptoms started, how it feels, where it hurts, when the pain occurs, how long the pain lasts and what motions or activities cause the pain or symptoms.

Report injuries, regardless of where they happened. Avoid exposing injuries to more risk factors. Your supervisor can help you determine how to address risk factors and may also advise you about healthcare options that your employer provides.