

ERGONOMICS



inghamton University

Environmental Health & Safety

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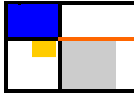


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Introduction to Ergonomics

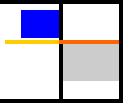
The purpose of ergonomics is to reduce physical and psychological stress by adapting the job and working conditions to the employee in order to prevent injury. The implementation of ergonomics into your work and home environment helps protect you from acquiring musculoskeletal disorders (MSD's) and stress related illnesses.

This brochure will cover the steps you can take to prevent injury before it causes you pain. This can be done by adjusting your work environment to fit your needs by setting up a user-friendly workstation and by maintaining correct posture with the help of stretches and exercises shown in this brochure. We will also explore ways in which ergonomics can make your home and garden user-friendlier.

There are steps you can take to relieve stress, promote deeper relaxation and keep your mind and body well and balanced even in the midst of your hectic schedule. When you apply the ergonomic techniques discussed in this brochure to both your work and home environments, you will notice a difference in the way you feel and you will be better equipped to prevent injuries.



A healthy worker is a happy worker!



Musculoskeletal disorders

MSD's occur due to repeated trauma, repetitive stress on particular areas of the body, and occupational overexertion. They can affect the hands, fingers, back, neck, wrists, legs, shoulders as well as soft tissue. Developing gradually over time, the warning signs of MSD's include pain, stiffness, tingling, numbness, difficulty moving, muscle loss, paralysis, or lack of strength.

Your ability of an employee to fulfill responsibilities at work is compromised when You have an MSD. 34% of all lost workdays are due to these injuries, costing \$15-\$20 billion dollars in workers' compensation in a year. The average recovery time from an MSD injury is 28 days and workers with severe injuries face permanent disability that may prevent them from returning to their jobs as well as handling everyday tasks.

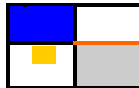
The best way to prevent from becoming victim to these injuries and illnesses is to learn how to recognize signs of MSD's before they become debilitating and to know the easy steps you can take to prevent them. Using ergonomics to modify your workplace can greatly enhance your ability to prevent MSD's and stress related illnesses.

Types of Musculoskeletal disorders

Carpal Tunnel Syndrome (CTS): With CTS, the median nerve in the wrist becomes pinched due to performing repetitive and forceful tasks over time without giving the body enough time to relax and recover. This causes tingling, numbness, pain, as well as loss of strength and sensation in the thumbs and fingers.

Prevention!

Give yourself breaks when performing repetitive tasks. You may also be able to use job rotation to put more variation into your tasks and use stretches from the following section. Practice stretches for the wrists, arm and shoulder.



Musculoskeletal disorders

Sciatica: When you sit a lot or if you injure your back, you may experience pain due to pressure on the sciatic nerve. This may feel like a burning or tingling sensation down the leg, weakness, numbness, or difficulty moving the leg or foot, constant pain in one side of the buttocks, or a shooting pain that makes it difficult to stand up.

Low back pain: This can result from many things including improper lifting or sitting posture, excessive vibration, or other back strain. Smoking can also lead to low back pain as it increases the risk of vascular disease. When damage of the vascular structures of the disks and joints occurs, pain can result.

De Quervain's disease: due to gripping and twisting motions in the hands, this MSD causes pain in the base of the thumbs.

Trigger finger: the repeated use of the index finger can cause it to move with snapping movements and range of motion is compromised.

Prevention!

Stretching out your lower back, hips and legs, maintaining proper posture, and making sure to give yourself breaks from sitting can help to prevent sciatic pain.

Prevention!

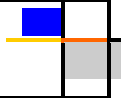
Be very conscientious about your posture and in choosing what you lift manually. Studies have shown that smoking may cause low back pain due to decreased circulation in that area. Follow the guidelines in the next section

Prevention!

When you grip things, even a pencil or a pen, use a looser grip and be careful not to over-strain your hand when you are twisting things. Use fist exercises and hand stretches to loosen this area up. (see stretching section)

Prevention!

Avoid excessive amounts of repeated vibration. You can massage your hands to stimulate circulation.



Rotator cuff injury: When you repeatedly use your arms above their head, they are at risk of damaging your shoulders, causing pain and stiffness.

Raynaud's Syndrome: also called "white finger", this MSD is caused by repeated exposure to vibration and causes tingling, numbness, and loss of feeling, control and color of finger(s).

Prevention!

Use a stepladder or other safe platform to raise yourself so you do not have to work with your arms above your head.

Prevention!

Spread the finger work out to other fingers on the hand in addition to the index finger. Also, keep the fingers limber.



Don't let this happen to you!

Further MSD Prevention:

- Employees should file an accident report and look for patterns
- Learn to recognize symptoms early and seek qualified medical treatment if necessary.
- Read the suggestions in this brochure and incorporate as many ergonomic adjustments as possible for your comfort.



Setting up your workstation

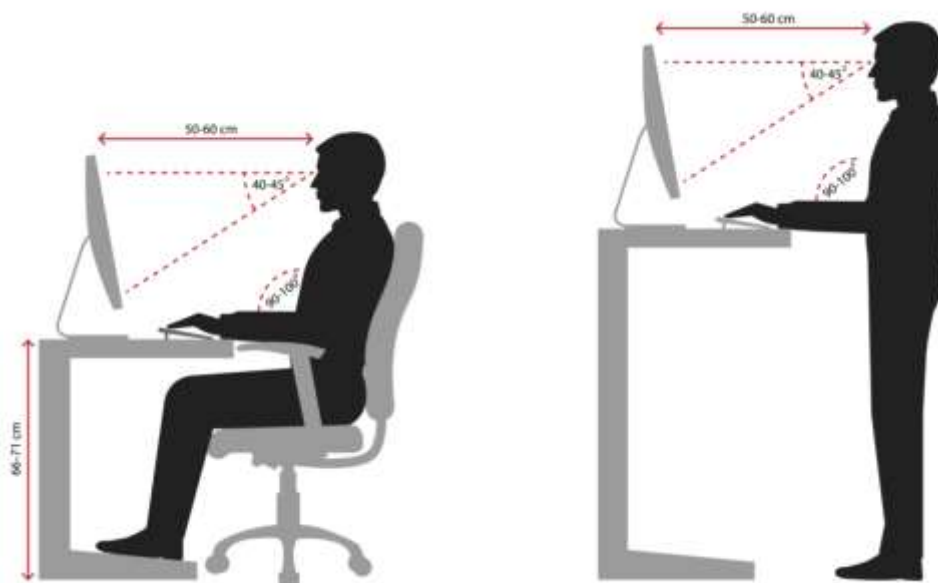
The concept of ergonomics is to fit the workplace to you, the user. Limiting repetitive movements, using basic, adjustable tools and supports, and ergonomic education all do this. It is also necessary to use proper lifting techniques, postures, movements that can be incorporated into work breaks, and available support tools for the workstation. Once this is done, there is a better fit to your equipment and ability for you to shift positions, therefore making your work environment more comfortable.

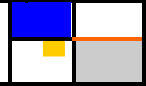
Setting up a workstation that fits you: Proper setup of your workstation is key to having a lower stress work environment. Here are some general guidelines:

Chair:

Using a chair that is adjustable allows you to use various postures.

A backrest with proper lumbar support is ideal for maintaining correct posture and arm rests help to reduce shoulder strain. If your chair does not have adequate support, you can roll up a towel or use a pad and place it behind the curve in your back.



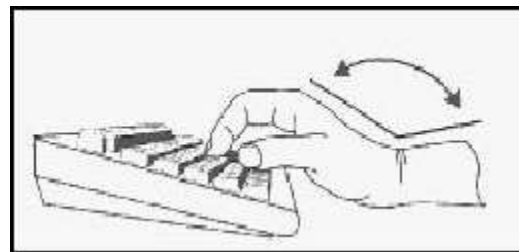
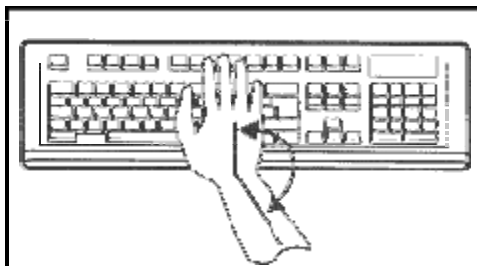


Keyboard and mouse:

Split keyboards are very popular, but they are not suitable for everyone. When choosing a keyboard, pay attention to your wrist posture and the size of your hand in relation to the keyboard, following the guidelines below to ensure the right fit.

The mouse should be close to the keyboard so the operator does not need to reach repeatedly. If there is not a close place for the mouse, consider a rotating mouse platform.

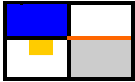
A wrist rest may provide support and encourage proper wrist position to prevent injury. Place one along the front edge of your keyboard for wrist/hand support.



DO NOT bend your wrist in these awkward postures.
Over time this will injure you.



This is the proper way to position your wrists while using a keyboard, forming a straight, even line from the arm through the wrist joint.



Workstation

Monitor and document:

The display screen should be placed so it is directly in front of you and so that the top of the screen is at eye level. The preferred viewing distance is 18 inches. If you have a large monitor, you should adjust the size of the document you are reading/writing so you don't have to move your head constantly.



Adjust monitor by placing it on a stand and tilting it forward or backward.

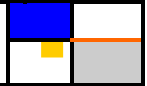


Environment:

Lighting should be adequate, but should not cause glare on the computer screen and should not be directed into your field of view. Adjustable lighting allows the operator to alter the contrast as needed, and a matte finish on the wall reflects light adequately preventing glare.



Cleaning the monitor frequently to remove dust particles can help to reduce glare and glare filters can be placed on the screen to help as well.



Work Process:

The way in which an employee uses her or his workstation is as important as making the workstation fit the employee. Repetitive motions and prolonged activity without a break increase your chances of becoming injured or fatigued.

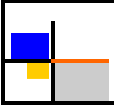
Microbreaks should be taken every half-hour to allow the body a chance to stretch and shift position.



Proper reach area:

Things that you use often should be kept close by to prevent strain due to reaching. However, things that will only be used a few times during the day should be kept some distance away so you have to stand up and walk to get them. This promotes movement during otherwise sedentary work.





Body Mechanics

Body Mechanics:

The body position you use to perform your daily tasks is as important in maintaining your health as having an ergonomically designed workstation.

It is preferable to lift loads that are off the floor, about waist high, and easy to reach. Keep this in mind as you are placing loads that will later be lifted manually.



Correct lifting technique:

- First:
- check to see if the load is heavy or light
 - make sure the path of transportation is clear of obstacles
 - keep your back straight and bend your knees to pick up the load
 - use a smooth motion when you lift, don't jerk
 - keep load as close to your body as possible when you lift
 - as you stand, let your legs do the work

Pushing or pulling a load: it is easier to push a load than to pull a load. If you have to pull a load, it is best to keep the cart at your side.



This motion is hard on your lumbar spine, so it is important to use a diagonal foot position and get as close to the load as possible by bending your legs, not your waist. As you stand, use your legs do the work. Then, keep the load close to your body as you stand up.



Daily Routine

The following sections deal with factors of daily life that can be modified and improved to keep your energy flowing, your back with three beautiful curves and your shoulders toned and relaxed. Go through these exercises whenever you are feeling tired or achy during the day.

Posture



Posture:

It is important to use different postures throughout the day to cut down on stress to particular areas. Postural exercises can also help promote proper alignment in the body, you can shift your posture standing and sitting just by leaning.

Standing:

When standing for a long period of time, place one foot on a stool to reduce stress on your lower back.

Sitting:

Keep your head and neck upright, your wrists straight, and your forearms parallel to the floor. Support your lower back with a cushion or rolled towel, and keep your feet on the floor or support them with a footrest.

Shift your posture by leaning back or forward in your chair, and take breaks to stretch and walk often. You should not spend more than twenty minutes in the same position without shifting.





Stretches and Exercises

Postural stretches and exercises:

By strengthening certain muscle groups, you can assist your body in its quest for better posture and better health.

Your core muscles are important for building long-lasting strength and these will need to be strengthened for other muscles to work to their potential. Core muscles are not limited to abdominal and back muscles, they also include your pelvic muscles and hips as well as the many tiny muscles layered beneath. Developing core strength stabilizes you and puts more power into any activity whether it be throwing a ball, shoveling snow or simply having energy throughout your day. A weak core can make you more prone to injury and allow your body to deteriorate more quickly with age. The exercises below will strengthen your core muscles and improving your health and posture.



Bend knee to chest and hold to stretch hip. Repeat on both sides.

Crunches will help to strengthen your core stomach muscles. Do 30 every day.



Stand in a doorway with your arms extended to shoulder height and your hands on the walls. Lean forward and hold for 15-30 seconds, repeating 3 times. This will help to strengthen your shoulders and improve your health and posture.



Lay on your stomach and then lift your arms and legs as shown. Hold for 15-30 seconds and repeat 3-5 times. This exercise strengthens your lower back muscles, which are very important for maintaining good posture.

Open your hand wide as shown, then make a fist with your thumbs across your fingers and your fingers tucked under and squeeze. Now, open your hand wide again, then make another fist with your thumb parallel to your fingers and fingers to palm. Repeat this 20-40 times.



Stretch your arms straight out, palms up. Then rotate your palms down to stretch. Repeat a few times.

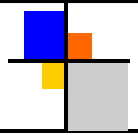




For this exercise, grasp the underside of a chair with one arm and lean your head to the opposite shoulder. Then, lean you whole body. You will feel this stretch throughout your shoulder and neck, this stretch is **GREAT** for headaches, neck pain and shoulder discomfort Do this stretch on each side 3 times, holding each stretch for about 15 seconds.

Reducing eyestrain will help to prevent headaches and to preserve vision. This exercise will help to stretch the muscles around your eyes. Look up and hold, then to the side, down and to the other side. Finish with a smile because the smile naturally releases chemicals in your body that promote positive feelings.





Ergonomics at Home

Ergonomics at home:

Ergonomics is important at work and is important at home.

Here are some suggestions on how to make your home user-friendly:

Entryway

Leaving shoes at the door cuts down on time spent cleaning the rest of the house.

Kitchen

A refrigerator with the freezer in the bottom cuts down on back strain.

Hanging pots and pans and keeping commonly used utensils within reach cuts down on unnecessary movements.

Bathroom

Bath and floor mats help prevent slipping in the bathroom.

Faucets that turn on and off easily prevent unnecessary hand strain.

Gardening

Stretch and exercise throughout the week if you work in the garden on the weekend.

Stretching the hamstrings in particular cuts down on low-back injury

A kneeling position is best for the back. Use a kneepad to cushion the knees

Take breaks and shift positions to prevent strain.

Keep tools in accessible locations and keep hoses on a reel for easier to management and use.

Reading

Book lights help provide direct light when reading

Use a bookstand or a pillow to lift and angle the reading material so you do not have to bend your neck over to read.



Athletics

Athletics

Exercise is an important part of maintaining your overall.

Always warm up before you exercise. It is recommended to stretch for at least 10 minutes before you exercise and for at least 5 minutes after you finish.

Make sure you work as many different muscle groups as you can (cross training). This helps maintain balance in the body.

After exercise, have a cool down period where you allow your body to relax slowly, then finish up with some more stretching.

Warm up stretches:



Gastrocnemius



Soleus



Psoas



Hamstrings



Adductors



Adductors



Adductors



Quadriceps



Gluteals



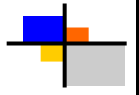
Triceps



Pectorals

Note: When stretching, let your body go naturally into the movement.

Bouncing or straining can injure muscles. Generally, it is advisable to hold stretches for 15–20 seconds.



Stress Relief

Reducing psychological stress:

As well as taking care of your body, it is important to maintain awareness about how your mind is feeling. Working constantly without letting the brain take a rest can allow stress to accumulate. Stress can contribute to many illnesses, it is important to give yourself time to transition from work to home.

Practicing 5-10 minutes of meditation before you go to work, at lunch or before you return home, you can allow your mind and body to reintegrate and transition more smoothly to the next task.

Regular meditation also improves your health by benefiting the cardiovascular system, tight musculature, upset stomach, and by boosting the immune system. It is also beneficial for fatigue, insomnia, living with pain or anxiety, and when dealing with chronic illness.



Resources

BU Environmental Health & Safety:

Established in 1974, Environmental Health and safety aims to provide guidance needed to promote a safe campus environment for all faculty, staff, students and visitors. If you would like additional information, you can contact Stephen Endres at 777-7012, or visit our website at: www.ehs.binghamton.edu.

Employee Assistance Program (EAP):

EAP offers assessment and referral counseling for faculty and staff of the campus community. Recognizing that employees face stress and pressure that affect their ability to work, EAP assists employees with low or no-cost services that can help them with family or work related problems and emotional, physical, or drug related problems. This program is available to all New York state employees, retirees and their families.

If you would like to know more about EAP, contact them at 777- 6655.



Binghamton University

Environmental Health & Safety

Ergonomic Work Station Checklist

Before you call, have you modified your working conditions to avoid the following?

___ Excessive repetitive motions?

___ Glare?

___ Awkward postures of the wrists, shoulders, back and hips?

___ Straining to reach something?

___ Are you getting sufficient breaks and using them to stretch, exercise?

___ Are you lifting properly?

___ Sitting and standing properly?

___ Are you stretching and exercising on a regular basis?

___ Are you avoiding hunched positions and keeping your back straight?

___ Are you using the stress relief techniques described in this brochure?

(please refer to this brochure while going through this checklist and make extra copies as needed)

Work Sheet

(To be filled out after reading and following up on the checklist.)

Name: _____ Date: _____

Work Location: _____ Job Title: _____

Supervisor: _____ Time on this Job: _____

Have you had pain in the last year? _____

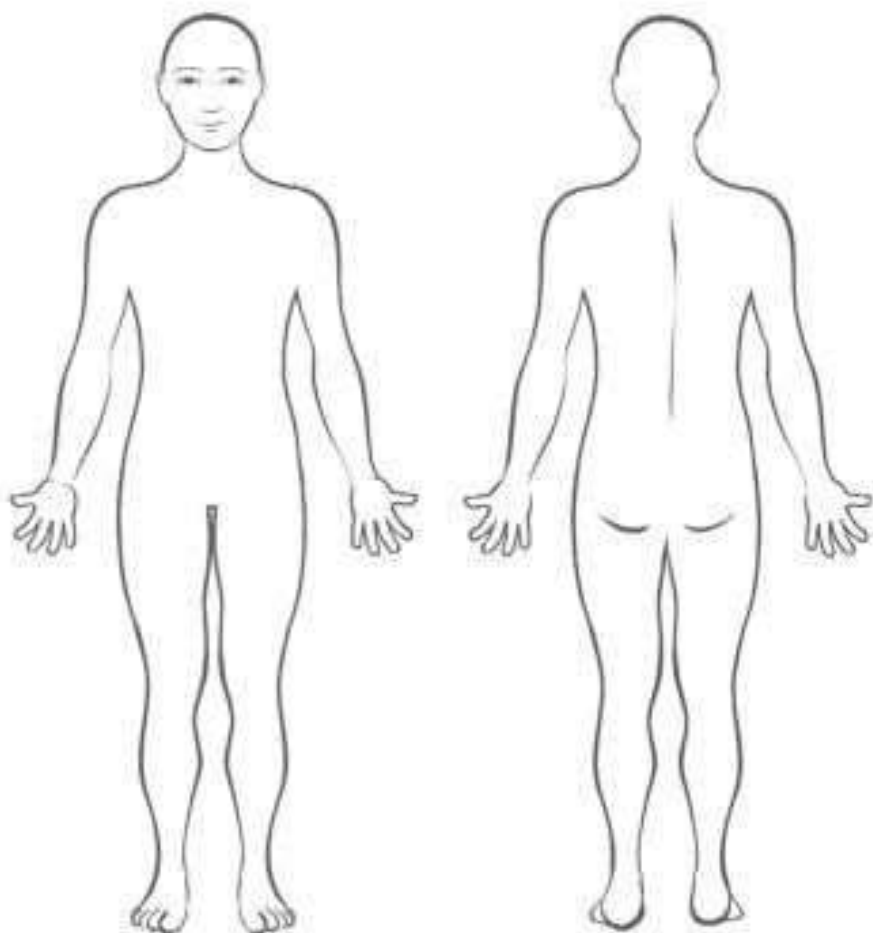
(Please mark the locations that bother you the most on the chart below.)

Are there any current symptoms? _____

Have you sought medical treatment? Yes _____ No _____

What do you think would improve your symptoms? _____

Additional comments: _____



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After you have completed this worksheet, please return to EH&S office; Health Services Bldg.; Attn. Stephen Endres