**ERGONOMIC GUIDELINES**

**TABLE OF CONTENTS**

I. Introduction ......................................................................................................................... 3
   A. Scope and Application ...................................................................................................... 3
   B. Responsibility.................................................................................................................. Error! Bookmark not defined.
   C. Availability ................................................................................................................... 3
   D. Annual Review .............................................................................................................. Error! Bookmark not defined.

II. Purpose ............................................................................................................................. 4

III. General Procedures ........................................................................................................ 4
   A. Computer Work Stations ................................................................................................. 4
      1. Work Process and Recognition .................................................................................. 4
      2. Desk ............................................................................................................................. 8
      3. Chairs .......................................................................................................................... 9
      4. Keyboards .................................................................................................................. 9
      5. Mouse/Pointer ............................................................................................................ 10
      6. Wrist/Palm Supports ................................................................................................. 10
      7. Monitors ..................................................................................................................... 10
      8. Telephones ................................................................................................................. 10
      9. Environment ............................................................................................................... 11
   E. Material Handling over 25lbs. .......................................................................................... 12
      1. Proper Lifting Techniques ......................................................................................... 12
      2. Prevent Back Injuries (stand-up jobs) ..................................................................... 12
      3. Prevent Back Injuries (sit-down jobs) ...................................................................... 13
      4. Avoiding Injuries ........................................................................................................ 13
      5. Controls and Prevention ......................................................................................... 13
   F. Ergonomic Analysis ........................................................................................................ 14
I. Introduction

Gettysburg College has instituted an Ergonomic Guidelines to help improve employee health and safety. The Ergonomic Guidelines are in accordance with 29 CFR 1910 Occupational Safety and Health Administration (OSHA), Proposed Ergonomic Protection Standard, Federal Register, March 20, 1995.

Ergonomics is the science of fitting workplace conditions and job demands to the capabilities of the working population. Effective and successful "fits" assure high productivity, avoidance of illness and injury risks, and increased satisfaction among the workforce. Although the scope of ergonomics is much broader, the term here refers to assessing those work-related factors that may pose a risk of musculoskeletal disorders and recommendations to alleviate them.

Common examples of ergonomic risk factors are found in jobs requiring repetitive, forceful, or prolonged exertions of the hands; frequent or heavy lifting, pushing, pulling, or carrying of heavy objects; and prolonged awkward postures. Vibration and cold may add risk to these work conditions. Jobs or working conditions presenting multiple risk factors will have a higher probability of causing a musculoskeletal problem. The level of risk depends on the intensity, frequency, and duration of the exposure to these conditions and the individuals' capacity to meet the force of other job demands that might be involved.

A. Scope and Application

These guidelines cover musculoskeletal disorders in backs, upper and lower extremities. This includes back injuries, cumulative trauma disorders, repetitive strain disorders, etc.

It applies to all Gettysburg College jobs that require more than two hours per day of: performance of the same motion every few seconds (computer keyboard entry), fixed or awkward position (kneeling, twisted or bent back, overhead work, stooping), or use of vibrating or impact equipment. It also applies to any job requiring manual handling of 25 pounds or more.

B. Availability

The Gettysburg College Ergonomic Guidelines shall be readily available to employees and employee representatives through their supervisor or the Human Resources Office.
C. Guideline Review

The Gettysburg College Ergonomic Guidelines shall be reviewed periodically by the Director of Life and Fire Safety Services.

II. Purpose

These guidelines were established to prevent the occurrence of work-related musculoskeletal disorders at the college. It informs college personnel about musculoskeletal disorders and the risk factors that can cause or aggravate them. It strives to promote continuous improvement in the workplace ergonomic protection including proactive action to minimize the likelihood of injury. It identifies design principles that prevent exposure to risk factors and stresses education and action on individuals' parts.

III. General Procedures

A. Computer Work Stations

1. Work Process and Recognition

   (a) Prolonged activity

   Computer work may appear to be a low effort activity when viewed from a total body perspective, but maintaining postures or performing highly repetitive tasks for extended periods can lead to problems in localized areas of the body. Users must provide a variation in job tasks to allow time to recover from the effects of activity. Alternate job tasks throughout the work day will prevent long term activity of the same repetitive tasks. Users should take mini-breaks and perform stretching exercises regularly to allow muscles a change to recover.

   (b) Medical Awareness

   It is important to report signs and symptoms as early as possible to prevent serious injury or permanent damage. Users at risk for
associated with computer use may experience some of the following signs or symptoms:

- Numbness or a burning sensation in the hand
- Reduced grip strength in the hand
- Swelling or stiffness in the joints
- Pain in wrists, forearms, elbows, neck, or back
- Reduced range of motion in the shoulder, neck, or back
- Dry, itchy, or sore eyes
- Blurred or double vision
- Aching or tingling
- Cramping
- Loss of color in affected regions
- Weakness

(c) Good Working Positions

A good working position is recommended for each workstation and it is helpful to understand the concept of neutral body positioning. This is a comfortable working posture in which your joints are naturally aligned. Working with the body in a neutral position reduces stress and strain on the muscles, tendons, and skeletal system and reduces your risk of developing a musculoskeletal disorder. The following are important considerations when attempting to maintain neutral body postures while working at the computer workstation:

- **Hands, wrists, and forearms** are straight, in-line and roughly parallel to the floor.
- **Head** is level, or bent slightly forward, forward facing, and balanced. Generally it is in-line with the torso.
- **Shoulders** are relaxed and **upper arms** hang normally at the side of the body.
- **Elbows** stay in close to the body and are bent between 90 and 120 degrees.
- **Feet** are fully supported by floor or footrest.
- **Back** is fully supported with appropriate lumbar support when sitting vertical or leaning back slightly.
- **Thighs** and **hips** are supported by a well-padded seat and generally parallel to the floor.
• **Knees** are about the same height as the hips with the **feet** slightly forward.

Regardless of how good your working posture is, working in the same posture or sitting still for prolonged periods is not healthy. You should change your working position frequently throughout the day in the following ways:

• Make small adjustments to your chair or backrest.
• Stretch your fingers, hands, arms, and torso.
• Stand up and walk around for a few minutes periodically

(d) **Awkward Positions**

Working in awkward postures can irritate or strain the bone-tendon-muscle connections.

• Muscles can be stretched or compressed causing them to be inefficient and resulting in possible fatigue and overexertion.
• Non-neutral postures can pull and stretch tendons, blood vessels, and nerves over ligaments or bone where they can become pinched and restricted.
• Tendons and their sheaths can rub on bone and ligaments, which can lead to irritation and fraying. This can lead to swelling within confined areas such as the carpal tunnel, which then restricts nerves and blood vessels.
• Tingling and numbness of the fingers and hands as well as pain from tendinitis and tenosynovitis (inflammation of a tendon sheath) can result.

(e) **Contact Stress**

There are two different types of contact stress; internal and external:
• Internal stress happens when a tendon, nerve or blood vessel is stretched or bent around a bone or tendon.
• External stress is when a part of your body rubs against a component of the workstation and irritates the nerves or constricts blood vessels.
(f) Force

Force is usually thought of as a strenuous physical exertion, such as when lifting a heavy weight or pushing a heavy load. Computer work seldom requires this type of strenuous exertion, but there are tasks that require concentrated force that can affect smaller, localized muscle groups. Although the muscle is usually the first point of pain when these injuries occur, the tendon, which attaches the muscle to bone, can also be affected. Localized pain, stiffness, and tenderness can signal that the muscle or tendon has been exerted beyond its capacity.

To help avoid these problems, properly arrange computer components on the work surface to maintain neutral postures and provide adjustable furniture to minimize the amount of time spent in one posture.

(g) General Controls

- Keep your head, neck vertical and in-line with the spine, not bent or twisted.
- The torso should be straight, not twisted, especially when lifting or bending.
- The torso should be vertical or within 20 to 30 degrees or vertical whether standing or sitting.
- Keep elbows close to the body by avoiding frequent reaching to the side, in front and above the head.
- Forearms should be kept parallel to the floor.
- Maintain a neutral forearm posture.
- Keep your wrists straight and in-line with your forearms, not bent up or down or to either side.
- Keep thighs approximately parallel to the floor or hips slightly higher than the knees.
- Keep the feet firmly on the floor and legs approximately perpendicular to the floor.
- Place the keyboard and mouse close together at about the same height to reduce reaching.
- Use a fully adjustable chair so the body is fully supported and change body postures frequently.
- Use adjustable height work surfaces so all users can sit with their feet firmly on the floor. If the work surface is not fully adjustable, use an adjustable foot rest.
- Place all frequently used components such as monitor, keyboard, and mouse in front to prevent turning the head from side to side.

- Place your monitor low enough so it’s top is not above the horizontal line of sight. This will limit the need to tilt the head backward to see the screen.

- If laptops are to be used as primary work computers where intensive keyboard use is necessary, provide auxiliary, full-sized, keyboards and monitors.

(h) Repetition

Many computer workstation tasks are highly repetitive. Users may perform the same motions repeatedly at a fast pace and with little variation. When motions are isolated and repeated frequently for prolonged periods, there may be inadequate time for your muscles and tendons to recover. Combining repetitive tasks with factors such as awkward postures and force may increase the risk of injury.

The following work process suggestions may also help reduce repetition.

- Task Rotation or Job Enlargement - If users must perform a variety of tasks, when possible, intersperse them throughout the work day. Minimize long blocks of uninterrupted computer time by doing other non-computer tasks such as photocopying, phone work, cleanup, etc.

- Micro Breaks or Rest Pauses - Build short micro pauses into computer use sessions. Frequent short breaks are desirable. Every hour, take a five-minute break from computer tasks. Look away, stretch, get up, or walk. These brief pauses provide time for muscles and tendons to recover.

2. Desk

A desk should provide adequate clearance for the legs, allow proper placement of computer components and accessories, and minimize awkward postures. The desk surface should allow the monitor to be placed directly in front of the user and about 20 inches away. The area under the desk should be kept clear from storage and placement of other items that will interfere with the user’s movement. The desk should allow plenty of work space so that the user is not restricted to small areas to perform tasks. Desk height should be between 20 and 28 inches high. The height maybe altered by raising or
lowering the desk legs, by using a higher chair with a foot rest or by providing an automatic adjustable desk.

3. Chairs

A chair must provide support for the back, legs, buttocks, and arms to reduce the awkward postures, contact stress and forceful exertions. The chair must be able to adjust to each user to support a variety of sitting postures and positions. This is very important for workstations that are shared between multiple users. In some cases, a user may have to try several different chairs to find a comfortable fit for them. There are four basic components of a chair that need consideration:

1. Backrests- should conform to the natural curvature of the user’s spine and provide adequate lumbar support. Backrests should be able to lock into place or be tension adjustable to provide adequate resistance to the lower back.
2. Seat- needs to have an adjustable height to keep the user’s feet flat on the floor. A seat too high or too low will cause stress in the lower back, legs and hips. Seats should be well padded and wide enough to allow the user to comfortably move around within the seat. Tall users should have a deeper seat then shorter users.
3. Armrests- are needed for users who have long periods of keyboard use and require support for the elbows and arms. Adjustable padded armrests are recommended if the user is having difficulty with their shoulders and wrists. Armrests that are not adjusted properly can cause as much stress and no armrests. Be sure that the armrest is adjusted properly to the user.
4. Chair Base- Chairs will four or less legs may provide inadequate support and are prone to tipping. Chairs should have a five leg base and ensure that the casters are appropriate for the floor surface.

4. Keyboards

Proper placement of keyboards is very critical to prevent contact stress and awkward positions. The keyboard should be directly in front of the user with the correct height and distance for each user.

The height of the keyboard should be in line with the users wrists and forearms, so that a comfortable neutral position is maintained. A low keyboard can cause the wrists to bend up and too high will cause the user to raise their shoulders to adjust the difference. Prolonged use will cause stress in the wrists, shoulders and elbows. Keyboard trays can often times be used to provide the necessary height, especially for multiple user works stations.
The distance of the keyboard to the user should allow your elbows to stay close to the body and forearms approx. parallel with the floor. Some users require additional keyboard support by raising the keyboard angle up, down and tilted outward. There are multiple keyboards available to help maintain a neutral wrist posture. These situations require a case by case evaluation to determine the best fit for the user.

5. Mouse/Pointer

The pointing device causes a repetitive motion for the users who constantly perform tasks involving the keyboard and the device. Keeping the device close to the keyboard and at the same height level reduces the repetitive motion. In some cases, the user may need a trackball, touch pad or joystick device to perform their tasks more efficiently with less repetition. Different size devices are available to adjust the user’s hands and grip. These devices are normally adjustable with speed and sensitivity within the computer setup and device programming. The user’s motion and movement can be reduced by adjusting these settings. Users should avoid tight grips on these devices and use a light touch to reduce finger contact stress.

6. Wrist/Palm Supports

Wrist and palm supports help create a comfortable position for the user’s wrists during prolonged usage on a keyboard or pointer device. They reduce muscle activity and facilitate neutral wrist angles. The user’s heel of their palm should be resting on the pad. The height and length of the support needs to be adjusted to the user to main a straight wrist posture. These supports can also eliminate hard contact points such as the edge of a desk or keyboard tray.

7. Monitors

Monitors should be placed directly in front of the user and about 20 to 40 inches away. The top of the monitor should be at or just below the user’s eye level. The center of the monitor should be about 15 degrees below the user’s eye level. Improper viewing distances and height can cause awkward positions that can lead to eye strain or muscle fatigue. Monitors should not be more than 35 degrees to the right or left of the user. Users need to avoid long periods of viewing the monitor. Long periods of time can cause eye fatigue and dryness. Regular breaks should be taken and do other tasks not involving the monitor to break up the time period. Monitors should not be tilted backwards. This causes glare from overhead lights. Tilt the monitor slightly forward about 10 to 20 degrees.

8. Telephones
Telephones should be kept within arm’s reach of the user to prevent leaning forward. They should be located to the left or the right of the keyboard, so the user doesn’t have to turn or move to answer the phone especially those use need to obtain information from the computer while on the phone. Users whose main job task is to answer the phone may require the use of a speaker phone and/or a hands free headset.

9. Environment
   a. Lighting- Bright lights shining on the display screen "wash out" images, making it difficult to clearly see your work. Straining to view objects on the screen can lead to eye fatigue. Avoid placing the monitor directly in line with a window, so the sun is not directly effecting the user.

   b. Glare

   c. Ventilation
   d. Document Holder
B. Material Handling over 25lbs.

**Proper Lifting Techniques**

a) Take a balanced stance, feet shoulder-width apart

b) Squat down to lift, get as close as you can

c) Get a secure grip, hug the load

d) Lift gradually using your legs, keep load close to you, keep back and neck straight.

e) Once standing, change directions by pointing your feet and turn your whole body. Avoid twisting at your waist.

f) To put load down, use these guidelines in reverse

**Prevent Back Injuries (stand-up jobs)**

g) Provide foot rest and stand with one leg up and change legs often

h) Provide mats and floor coverings

i) Provide a stool or support where suitable

j) Provide opportunities to change positions or move around
10. **Prevent Back Injuries (sit-down jobs)**
   a) Provide arm, elbow, and wrist rests
   b) Provide adjustable chair
   c) Provide adjustable work bench
   d) Provide for arched back support

11. **Avoiding Injuries**
   a) Eliminate bending, twisting, & other awkward movements
   b) Store frequently-used materials in front of you at waist height.
   c) Heavier objects should not be placed overhead or on the floor
   d) Use mechanical lifting equipment
   e) Stretch and Exercise

12. **Controls and Prevention**
   a) Avoid extreme range of motion when lifting
   b) Redesign work station/work area to allow freedom of movement
   c) Use handles on material handling equipment
   d) Use lift-assist devices and tables
   e) Avoid lifting at floor/above shoulders levels.
   f) Eliminate unnecessary lifting.
   g) Hug the load
   h) Squat vs. Stoop
   i) Avoid reaching down into bins
   j) Avoid pushing/pulling
   k) Avoid lifting and bending whenever you can.
   l) Place objects up off the floor.
m) Raise/lower shelves.

n) Use carts and dollies.

o) Use cranes, hoists, lift tables, and other lift-assist devices whenever you can.

p) Test the weight of an object before lifting by picking up a corner.

q) Get help if it’s too heavy for you to lift it alone

D. Ergonomic Analysis

Any college employee or supervisor may request an ergonomic analysis of their work station and or environment by contacting the Human Resources Office. The Director of Life and Fire Safety Services will conduct and review all ergonomic analysis requests.

The ergonomic analysis will include a work station evaluation, employee interview, and listed recommendations for improving ergonomic stresses.