Ergonomic Guidelines for UCSD
Introduction

Ergonomics is defined as fitting the workplace to the worker and examining the interaction between the worker and his or her environment. Applying ergonomic principles can help reduce the risk of injuries or illnesses for those who work with computers, in laboratories, in jobs that require repetitive activities, and heavy materials handling.

The purpose of an ergonomics program is to reduce or eliminate hazards that contribute to the development of **Cumulative trauma disorders (CTD's)**, a class of disorders that are caused, precipitated, or aggravated by repetitive motions. The primary tools of UCSD's program are worksite evaluations, employee and supervisor training, and implementation of ergonomic control strategies. Ergonomics should not be seen as a one-time effort. It's a continuous, on-going approach used in optimizing the working environment.

One of the key aspects of the ergonomics program is identifying and educating employees who have a high risk of developing cumulative trauma disorders. Early identification of symptoms with prompt intervention helps prevent more serious or chronic problems. On-going training is available through Enrollment Central, as well as departmental group training on the following subjects: office and computer ergonomics, laboratory ergonomics, workplace specific issues, back injury prevention, and more.

**Ergonomic Guidelines for UCSD** was developed by the UCSD Ergonomic Review Guidance & Option Team (ERGO Team). The ERGO Team was comprised of participants from Environment, Health & Safety (EH&S), Purchasing, Employee Rehabilitation Program, Capital Planning & Budget, and Risk Management.

The ERGO Team thanks Lawrence Livermore National Laboratory for allowing UCSD to adapt some of it’s material for the purpose of educating employees.

Responsibilities

All UCSD staff and faculty members are responsible for contributing to a safe and healthy work place. Employees are encouraged to review information and to participate in education and training opportunities that can enable them to contribute to a healthy work environment. Since non-work activities can also cause or contribute to discomfort and medical impairments, employees are urged to apply ergonomic principles outside the workplace as well.

Managers

Managers and supervisors at all organizational levels play a leading role in implementing strategies to control cumulative trauma disorders in the workplace. These include:

- Read **Ergonomics: The Supervisor's Role** on Blink.
- Learn about CTD causes and control options.
- Provide resources (as available) to implement ergonomic solutions.
- Perform or request periodic risk assessments to identify ergonomic hazards.
- Purchase adjustable furniture that complies with standards established by the American National Standards Institute (ANSI) and UCSD's furniture guidelines (Appendix D).
- Restructure job tasks to reduce risk factors that contribute to CTD's.
- Encourage supervisors to implement steps to control CTD's in the workplace.
- Provide training to supervisors and employees.
Supervisors
Supervisors are encouraged to provide employees with appropriate ergonomics training, reinforcement, assistance, and evaluations (where appropriate). There are several ways this can be accomplished:

- Read Ergonomics: The Supervisor’s Role on Blink.
- Promote a safe and healthy work environment.
- Maintain an awareness of CTD risks.
- Evaluate the work environment for proper ergonomic practices and conditions.
- Provide proper workstations and assistive devices.
- Develop procedures to respond to employee concerns about CTD problems.
- Promptly report all employee injuries and employee complaints regarding cumulative trauma disorder symptoms.
- When necessary, seek assistance from EH&S, Employee Rehabilitation, or the Purchasing Department regarding ergonomic issues.
- Provide adequate recovery time by allowing employees engaged in highly repetitive tasks the opportunity for frequent, short, alternative work activities and breaks.
- Integrate ergonomics into total department safety management.

Employees
Employees are encouraged to promptly report ergonomic problems to their supervisors. Prompt implementation of workplace changes can significantly reduce the potential for severe injuries or illnesses. It is recommended that employees:

- Read Ergonomics: The Employee’s Role on Blink.
- Adjust and use their workstation and equipment as outlined in the ergonomic guidelines.
- Follow safe work practices.
- Make effective use of recovery periods.
- Perform simple exercises and stretches.
- Follow ergonomic recommendations.
- Report work-related injuries to supervisors.

Capital Planning and Budget
Capital Planning and Budgeting (CP/B) coordinates state and non-state minor and major capital improvement programs and prepares required documentation. CP/B is responsible for long-range facility planning, including workstation planning.

Employee Rehabilitation Program
The UCSD Campus Employee Rehabilitation Program serves faculty and staff members who have disabilities. The available range of services supports informed decision-making through intervention, job accommodation analyses, and placement efforts. Other services include vocational and personal counseling, performance of job and workstation analyses, and comparative analysis of medical restrictions and job requirements. The certified rehabilitation counselors are expected to:

- Evaluate workstations, work areas, job task design, and required job skills.
- Identify accommodation options to enable continuation or resumption of productive work activities.
• Educate supervisors, managers, and employees about effective disability management techniques.
• Provide guidance about workstation modification funding options.

Environment, Health & Safety Department
Industrial Hygiene Division (858) 534-1075

Environment, Health and Safety’s mission is to reduce health, safety, and environmental risks to the UCSD community. EH&S ergonomic specialists are expected to:

• Coordinate the ergonomics program to reduce cumulative trauma injuries at UCSD.
• Provide guidance on modifying the workplace to minimize the potential for injuries and illnesses.
• Provide ergonomics training for employees, supervisors, and managers.
• Analyze and report trends in injury or incidence rates, and in injury severity.
• Maintain an ergonomics database.
• Evaluate individual and departmental workstations after an injury has occurred or supervisor interventions have not alleviated employee discomfort.
• Provide assistance and advice on the selection of ergonomically sound furniture and equipment.

Workers’ Compensation (858) 534-4785

When an employee experiences a work-related injury or illness, workers’ compensation procedures are initiated. The program objective is to facilitate expedient recovery and return to productive work. Workers’ Compensation notifies the EH&S Industrial Hygiene Division of any new CTD injuries for follow-up.

Purchasing Department (858) 534-6721

Purchasing provides assistance and advice on procurement of ergonomically sound furniture and equipment from various vendors, as well as the UCSD Storehouse.

Process for Minimizing Ergonomics Hazards

Awareness of Cumulative Trauma Disorders (CTD’s)

Signs and symptoms of CTD's of the upper extremities include pain, numbness, or tingling of the fingers, wrists, elbows, or shoulders. Chronic back and neck problems may result in pain, numbness, or tingling that radiates to the arms or legs, as well as limited back motion. Reducing the risk of CTD problems can be achieved by doing the following:

• Read Ergonomic Awareness: Risk Factors on Blink.
• Evaluate the user’s interaction with the workplace to identify CTD risk factors.
• Encourage employee awareness and provide education.
• Use ergonomically appropriate work habits.
• Make workplace adjustments.
• Use ergonomically designed tools and furniture (i.e., provide flexibility for adjustments and allow for proper individual posture).
• Perform workplace exercises to relieve physical stress.
• Perform five minutes of alternative work activity for every 30 minutes of continuous, high intensity, repetitive work (for example: after two hours of continuous keyboarding, devote 15 minutes to non-repetitive motion activities like returning phone calls or filing).
• Evaluate and intervene as soon as symptoms of CTD occur.
Early Intervention

Early intervention is essential to quick recovery and long-term prevention of CTD's. It's extremely important for employees to immediately report any CTD symptoms. CTD's usually develop gradually. Symptoms such as pain, numbness, and tingling in the upper extremities are often ignored until the condition becomes chronic or permanent injury occurs. Employees experiencing symptoms are encouraged to contact their supervisor or safety coordinator.

Workplace Evaluations

- Read Ergonomics: Workplace Evaluations on Blink.

Eligible Employees

The ergonomics program and services described in these guidelines are applicable to all persons working at UCSD. Priority will be given to employees with reported CTD symptoms, employees with diagnosed CTD's, and employees who work in identified high-risk jobs or departments.

Procedures

Employees who are not experiencing pain or discomfort, but want to ensure their computer workstations are properly configured, can refer to How to Set up an Ergonomic Computer Workstation, or attend a training session on ergonomics (see Resources, Appendix F).

Evaluations for Computer Users

The department is responsible for providing initial assessments. The Computer Ergonomic Review Tool (PDF) (Word file) guides supervisors through computer workstation ergonomic evaluations. The resulting assessment reveals specific causes of discomfort and recommends necessary changes to work habits, equipment, and workstation configuration. Allow one month after recommended changes or equipment are implemented to see if the employee’s pain and discomfort is alleviated.

It’s important to ensure employees have adequate workspace to perform each of the tasks required by their jobs. Individual body size must be considered and will influence chair selection, the height of the work surface, and access to various elements of the workstation.

EH&S Ergonomic Computer Workstation Evaluation

Tier 2 evaluations: If pain or discomfort persist, supervisor’s can request a Tier 2 computer workstation evaluation by an EH&S ergonomics specialist. Complete the Tier 2 Computer Ergonomic Evaluation (PDF) (Word file) form and send it to EH&S via e-mail at ehsi@ucsd.edu, or Mail Code 0920.

EH&S computer workstation ergonomic evaluations will be scheduled on a prioritized basis. Results of the evaluation will be reviewed with the employee and their supervisor. For reported CTD cases, a signed report of the ergonomic evaluation will be sent to the employee and the supervisor.
Evaluations of Non-computer Workplaces

UCSD employees who do not work with computers may request a workplace ergonomic evaluation by e-mail at ehsih@ucsd.edu or Mail Code 0920. **Factors that cannot be assessed during an ergonomic evaluation**, such as a hobby or other non-occupational activity, may be contributing to discomfort or injuries in the workplace.

**Products and Equipment**

If used incorrectly, even new, ergonomically designed products can contribute to employee discomfort. **Training** in ergonomic principles and how to apply them to the individual's worksite is essential. Information obtained through training should be reinforced on a periodic basis with employees.

Ergonomic products do not have to be costly. Some corrections can be done in-house to meet individual needs. Contact the Purchasing Department for assistance with large purchases of products or furniture.

**Modification of Work Practices**

Improper configuration and use of computer workstations is a frequent contributor to the development of CTD's. A poorly designed workstation certainly has a negative impact on the user's comfort and productivity. Since personal computers have become indispensable in all aspects of UCSD's operations, many employees are spending four or more hours a day working at keyboards. It's essential that workstations be properly designed, adjusted, and used. Positive improvements may be as simple as repositioning furniture and equipment, or purchasing ergonomically designed replacements.

- Read [How to Set Up an Ergonomic Computer Workstation](#) on Blink for guidelines and resources.

**Record Keeping**

**Employee Rehabilitation Program**: Employee Rehabilitation case notes will be maintained separately to ensure the confidentiality of medical records. Statistical information regarding job analysis, workstation evaluation, and accommodation activity will be maintained by the Employee Rehabilitation Program.

**Environment, Health & Safety**: Records of ergonomic worksite evaluations conducted by EH&S ergonomic specialists will be maintained by EH&S for a minimum of three years. Updated records will be kept of those workplaces where recommendations have been made, or where new equipment or procedures are being used. All evaluation reports, including injury reports, will be maintained alphabetically by individual's name or departmental name.

**Departments and Supervisors**: Document all ergonomic assessments, implementation of changes or equipment resulting from assessments, and training employees receive.
Appendix A

Video Display Terminal Workstation Guidelines

Read How to Set Up an Ergonomic Computer Workstation on Blink.

Chair – A well-designed chair should have:

- An adjustable back to provide support for the lumbar region of the back and trunk. High-back chairs may provide extra upper back support.
- Easily accessible pneumatic height adjustment to permit the feet to rest flat on the ground with the upper legs parallel to the floor.
- A five-star base and casters compatible with the floor surface (rolls easily without friction).
- T-armrests with both adjustable height and width for intensive computer users.

Adjust the chair as follows:
When seated there should be one fist distance between the seat pan and the back of knee. If the chair must be raised to reach the work surface, a footrest may assist in supporting the feet as well, allowing the employee to sit back in his or her chair to take advantage of the lumbar support.

Work Surface – Work surfaces should meet the following criteria:

- Be large enough to accommodate all necessary computer equipment, including a wrist support in front of the keyboard.
- Be large enough to provide adequate viewing distance between the monitor and operator's eyes. Flat screen monitors may be helpful.
- Provide sufficient room under the work surface to allow free leg movement.
- The height of the work surface should allow the forearms to be approximately parallel with the floor when working at the computer, while not forcing the shoulders to be elevated. A keyboard tray may be used to increase distance and achieve proper keying level.

Keyboard/Input Device – Adjust the keyboard as follows:

- The keyboard and input device (mouse or trackball) should be at the same level and in front of the operator.
- Keyboard height and input device should allow the operator to position their forearms and hands approximately parallel to the floor. Achieve this by adjusting the height of the chair and/or table, or by using an adjustable tray.
- A padded wrist support for the keyboard and input device should be used to prevent the operator's wrists from coming in contact with the work surface when the arms are at rest. The wrist support should not support the user's upper body weight when keyboarding.
- Avoid overreaching by keeping the input device close to the body.

Monitor – Adjust the monitor as follows:

- Position the monitor directly in front of the operator with the screen at approximately eye level. One exception is bifocal wearers who may prefer a slightly lower monitor level.
- Position the monitor about an arm's length away from the operator.
- Monitors should have good contrast, sharp focus, and be free from flickering and glare to minimize eyestrain. Clean the glass often.
**Document Holder** – Position the document holder at eye level close to the monitor or angled just below the monitor (in-line).

**Telephone Headset** – Headsets reduce awkward neck and shoulder postures, notably by eliminating the habit of cradling the phone between the shoulder and chin. Headsets are particularly beneficial for people who work on the phone and computer simultaneously.

**Carpet Mat** – A carpet mat is helpful for reducing friction when the operator their chair around the workstation.

**Lighting** – Excessive overhead lighting causes glare and eye discomfort. Dimming overhead lights and use of a task lamp can reduce eye fatigue. Monitor shades and glare screens also reduce glare. Adjust monitor contrast and brightness for maximum personal comfort.
Appendix B

Hand Tool Ergonomics

Read Ergonomic Risks: For Shop, Maintenance, and Custodial Workers on Blink.

Proper attention to selection, design, and layout of tools can help minimize the risk of developing CTD's. Four basic principles can be applied when working with hand tools:

1. Avoid high contact stress and static exertions.
2. Avoid extreme or awkward joint positions. Examples are bent wrist position or prolonged overhead postures.
3. Avoid repetitive finger action.
4. Avoid tool vibration. Select power or pneumatic tools with built-in vibration damping whenever possible or vibration damping gloves.

Use these guidelines for the selection and design of tools:

- Handles should be provided whenever possible.
- A properly designed handle isolates the hand from contact with the tool surface, enhances tool control, and increases mechanical advantage while reducing the amount of required exertion.
- Tool handles should be non-porous, non-slip, and non-conductive.
- Soft coverings on a tool handle protect hands from heat and cold and help reduce pressure points and slipping of the grip.
- Select hand tools that fit the hands of the worker. A tool that is too large or too small will produce stress in the hand and wrist. As a general rule, the ideal handle diameter for a man is 1.5 inches, and 1.3 inches for a woman.
- Use pistol grip tools when the tool axis must be horizontal. Use a straight grip when the tool axis is vertical, or when the direction of force is perpendicular to the work plane. Bent tool grips allow the wrist to maintain neutral postures.
- For trigger-activated tools, choose a grip size that allows activation with the middle part of the fingers. Activation with the fingertips can create nodules on nerve sheaths and cause trigger finger.
- The majority of commercially available tools are designed for the right hand. Ideally, tools should be symmetrical or easily altered to be used by either the right or left hand.
- Select automatic spring opening on tools such as scissors, pliers and pruners when available. Spring opening devices enable workers to use the strong hand-closing muscles rather than the weak hand-opening muscles.

See correct positions for holding hand tools illustrated below.
Correct Positions for Holding Hand Tools

Neutral

Wrong

Right

Wrong

Right
Appendix C

Material Handling

Read Ergonomic Risk Factors: Material Handlers on Blink.

Principles for Manual Material Handling (MMH) Work Design

- Eliminate the need for heavy MMH
- Decrease MMH demands
- Minimize stressful body movements

1. Eliminate the Need for Heavy MMH:
The optimal solution to MMH-related problems is eliminating the need for heavy MMH work. In general, two means exist to accomplish this:

- Use mechanical aids to eliminate (or at least significantly decrease) stresses due to MMH. Mechanical aids include hoists, lift trucks, lift tables, cranes, elevating conveyors, gravity dumps, and chutes.
- To eliminate heavy MMH, change the work area layout to make all materials available at work level. Accomplishing this objective may require either a change in work level height or the level of the worker.

2. Decrease MMH Demands:
If MMH can’t realistically be eliminated, decrease the MMH demands of the job. There are several means by which this second principle of work design can be accomplished:

- Decrease the weight of the object being handled by:
  - Assigning two or more people to handle a heavy load
  - Distributing the load into two or more containers
  - Reducing the capacity of the container or the container weight (i.e., using plastic drums rather than metal drums)
- Change the type of MMH activity to less physically demanding ways of accomplishing the task:
  - Lifting, lowering, pushing, pulling, carrying, and holding are all types of MMH activity. It is preferable for a job to require lowering rather than lifting, to require pulling rather than carrying, and to require pushing rather than pulling. (For instance, make several trips with lighter loads; use a cart or dolly whenever possible.)
- Change work area layout
  - Minimize the horizontal distance between the starting and ending points of a lift
  - Limit stacking heights to the worker’s shoulder height
  - Keep heavy objects at the knuckle height of workers
- Maximize the time available to perform the job:
  - Reducing the frequency of lifts
  - Incorporate work/rest schedules or job rotation programs into the work design.

3. Minimize Stressful Body Movements:
The third principle of work design is to **minimize stressful body movements** required by the job. In particular, reduce bending and twisting motions.

- Reduce bending by locating objects to be handled within the arm-reach envelope of the worker.
- Provide all material at the work level of the worker.
- Avoid using deep shelves where the worker must bend and reach to obtain objects toward the rear of the shelves.
- Reduce twisting motions by locating objects within the worker’s arm-reach envelope.
- Arrange the work area to allow sufficient space for the entire body to turn and pivot with the feet.
- If the worker is seated, use an adjustable swivel chair.
- Design considerations should allow the worker to lift objects in a safe manner. Practice and encourage the safe lifting techniques described below.

### Safe Lifting and Good Body Mechanics

Read [How to Safely Lift and Carry](#) and [Maintaining a Healthy Back](#) on Blink.

- Allow the object to be handled close to the body.
- Use devices such as handles and grips for better control of the object being lifted or moved.
- Balance the contents of the containers.
- Provide rigid containers to increase worker control of the object.
- Avoid lifting excessively wide objects from floor level.
- Use good body mechanics: **bend your legs, not your back, when lifting.**
- Pivot with your feet instead of twisting your back when lifting.

### Sit/Stand Workstations

- Work surface height for a sit/stand workplaces vary depending on the primary job tasks involved. Recommended height for tasks involving large-size products or drawings is 44 inches above the floor.
- For tasks that can be done while sitting or standing, the recommended work surface height is 40 inches above the floor. Anything lower than 40 inches will cause stooping and excessive static exertions on the back and shoulder muscles, especially for taller workers.

### Anti-Fatigue Mats

Anti-fatigue mats provide additional support for workers at standing and sit/stand workstations. Mat size should be large enough for the worker to stand entirely on the mat when at the workstation. Select a mat free of raised or irregular surfaces that will cause concentrated forces on the feet of the worker.
Appendix D

Purchasing New Furniture and Accessories

Read How to Set Up an Ergonomic Computer Workstation on Blink.

Learn about what’s available and recommended for UCSD employees:

- Choose adjustable furniture and chairs. Plan ahead by anticipating future changes in tasks and employee needs.
- Contact Environment, Health & Safety for advice on the ergonomic features of products you're interesting in, and the Purchasing Department for price information and vendor referrals.
- Involve all potential users in the selection process by researching products before purchasing. Contact the Purchasing Department or vendors—see Resources below for product information.
- For furniture and chair purchases, consider Steelcase products first and ask about the University of California's contract with Steelcase. It provides a very significant discount off retail price.
- Check the refund policy before purchases are made.
- Have a product representative provide training on the features and proper use of the product.

Preferred features for chairs and furniture:

**Chairs**
- Pneumatic height adjustment
- Lumbar adjustment
- Adjustable seat pan depth
- Back rest angle
- Forward tilt
- Swivel
- Adjustable armrest height, width, and pivot
- Five-point casters
- Minimum 10 year warranty on parts

**Tables and Desks**
- Adjustable work surface
- Adequate dimension for tasks
- Smooth work surface edges and corners – no sharp edges
- Adequate leg clearance and space
- Non-glare finish
- Orientation of desk relative to windows and doors
- Placement of drawers and files relative to user

**Keyboard Platform**
- Adjustable height and tilt
- Width to accommodate both keyboard and mouse
- Built-in soft wrist support, or enough room for an add-on wrist support
• Flush profile construction of the adjustment mechanism to prevent contact with user's legs.
Appendix E

Resources

Blink
  • Ergonomics Main Menu
  • Ergonomics: Contacts
  • Workers’ Compensation Office
    o Campus-funded employees: (858) 822-2979
    o Healthcare-funded employees: (619) 543-7783

Training
  • Ergonomic Training Resources
  • EH&S Video Lending Library

Job Accommodation
  • Employee Rehabilitation Program: (858) 534-6744
  • Job Accommodation Network: 1-800-ADA-WORK