

Improving Work Surroundings Through Ergonomics

When discussing work surroundings with someone, ergonomics can be important to consider. Impressive improvements have been made in the number of worker injuries and illnesses reported in the past 40 years, with a drop from 10.9 incidents per 100 workers in 1972 to 3.4 per 100 in 2011.¹ However, there is still room for improvement. Many workers continue to develop work-related musculoskeletal disorders, soft-tissue injuries that occur gradually and include cumulative trauma disorders, repetitive strain injuries, and overuse injuries. Similarly, many employees have not taken the time to evaluate the ergonomics of workstations, ideally with the help of an ergonomics expert at their workplace.

The word ergonomics comes from the Greek words *ergo* (work) and *nomos* (laws) and it has been defined as, “the scientific discipline concerned with the understanding of interactions among humans and other elements of a system, and the profession that applies theory, principles, data, and methods to design in order to optimize human well-being and overall system performance.”² A simple way to describe ergonomics is “harmonizing workers with their jobs.” It includes the reduction of physical –and mental– stress related to how one’s workspace is arranged.

This handout focuses first on ergonomic assessments, then on interventions that can help for certain common situations.

Assessing Ergonomics at Work

Anyone with a job (or for that matter, a computer workspace at home) could be a good candidate for an ergonomics assessment. Those at greatest risk for ergonomics-related health problems include long-term health care employees (with nearly 14 injury cases per 100 employees),³ those who do highly-physical jobs requiring a lot of lifting and repetitive motion, and people who use computer workstations.

Three useful tools for assessing for ergonomics-related issues include:

OSHA Body Mapping Exercise

The [Ergonomics Body Map general assessment tool](#) is provided by the Occupational Safety and Health Administration (OSHA).⁴ It encourages patients to complete a diagram localizing their symptoms and categorizing their severity. This tool can be used in advance of an Integrative Health visit or patients can complete it afterward if improving ergonomics is a goal included in the Personal Health Plan (PHP).

Rapid Upper Limb Assessment (RULA)

This [Rapid Upper Limb Assessment \(RULA\) tool](#), offered through Cornell University's Ergonomics Web,⁵ focuses on biomechanical and postural load due to job tasks in terms of the neck, trunk, and upper extremities. It makes use of an easy scoring system, which is included on the form. If needed, a more detailed guide for using the tool is available on the [Ergonomics Plus Website](#).⁶

OSHA Computer Workstation Assessment Tool

The [OSHA Computer Workstation Assessment Tool](#), is an excellent tool which can easily be printed out and distributed to workers.⁷

Tips: Common Ergonomic Challenges and Solutions

Once a person's ergonomic situation has been assessed, suggestions for improving work surroundings can be tailored to individual needs. You can choose from among the following when advising patients:

General Tips (applicable to most occupations)

1. It all begins with mindful awareness. Pause long enough to actually take stock of the workplace environment. The goal is not only to critique the workspace, but also to suggest ways to make improvements.
2. Ensure people are following OSHA industry or task-specific guidelines. The United States Department of Labor OSHA website has excellent information related to prevention of musculoskeletal disorders in the workplace.⁸ In the right-hand column of the page is a list of guidelines for specific occupations.
3. Take frequent breaks. Taking a 3 to 5-minute pause every 30-60 minutes, and changing tasks every 20-40 minutes is likely to be helpful. Refer to the "Taking Breaks: When to Start Moving and When to Stop" tool. Get up out of your chair for every break. Rest your eyes during these breaks as well. While sitting, shrug, rotate, and relax your shoulders from time to time.
4. Maintain excellent posture, and vary your position throughout the day. Raise and lower your chair. Alternate between a sitting and standing work station, if possible.
5. Eliminate movement from the waist. Minimize bending, twisting, and leaning.
6. Always ensure the weight of the arms is supported, to prevent neck tension.
7. Never crane the neck. The head should be pulled down onto the neck by gravity (it should not bend in front of or behind the neck).
8. Recognize impending symptoms early. This is another area where proactive care can make a difference. Address wrist pain, for example, while it is merely discomfort, not after carpal tunnel syndrome has set in. Remind people they should always report pain that is persistent, worsening, interfering with sleep, radiating, or associated with numbness/tingling.
9. As a clinician, be familiar with local resources focusing on ergonomics. Occupational therapy can often be an invaluable resource. Refer as appropriate. Consider having an evaluation of your own workspace(s) as well.
10. Remember that these suggestions can also apply to work at home.

Tips Specific to Certain Jobs

RISK: Repetitive hand motion injuries

Solutions:

Minimize how much your hands must move.

Pause to stretch every 15-30 minutes.

Use power tools as able to reduce hand work.

Disperse repetitive work throughout the workday. Rotating tasks with other co-workers can help.

Change hands (left to right or vice versa) from time to time.

Change motions often.

Use full five-finger grip with something in the palm, versus a pinch grip where the object only contacts the fingertips.

If gloves are used, be sure they fit well.

Make certain hands stay warm.

Ensure hands have good traction (avoid picking up slippery objects).

RISK: Back and neck pain

Solutions:

Avoid awkward postures. Avoid twisting your neck by keeping objects in front of you.

Minimize kneeling and squatting when lifting. Lift with your legs, not your back.

Reduce size and weight of objects being moved.

Minimize awkward lifting (lifting that requires you to work above the shoulders, below the knees, or at arm's length).

Lift no more than twice per minute to allow core muscles to rest.

Slide objects to the body before lifting them, and work from the long side of any boxes or cartons.

Alternate body position (bending, kneeling, sitting on a stool, and squatting) when working with things below the knees.

Move the work for better access. Keep necessary items within close reach and move any obstacles.

Put handles on tops of objects.

Use lift tables or dolly carts.

Computer and Desk-Related Work

This information is compiled from multiple sources related to ergonomics in the office.⁹⁻¹² Figure 1 illustrates the best ergonomic posture when you are seated at a computer.



- Top of monitor at or just below eye level
- Head and neck balanced and in-line with torso
- Shoulders relaxed
- Elbows close to body and supported
- Lower back supported
- Wrists and hands in-line with forearms
- Adequate room for keyboard and mouse
- Feet flat on the floor

Figure 1. OSHA. *E-tools, Computer Workstations*.¹⁰

RISK: Computer monitor causes difficulties, including eye symptoms

Solutions:

Ensure monitor is easy to use without leaning forward or looking up or sideways. It should be at eye level or within 15 degrees.

Distance to a monitor should be less than arm's length.

Keep glare at a minimum. Glare guards can help.

If working back and forth between monitor and paper documents, ensure the documents are on a document holder. The document holder should be placed so that its positioning is similar to the computer monitor's.

Keep the screen clean to minimize distortion.

Adjust contrast and brightness.

RISK: Chair is uncomfortable and increases the risk of pain

Solutions:

Ensure normal spine curvature is maintained.

Adjustable chairs are advisable. It should be possible to adjust for height and back tilt.

Padded seats are better.

The chair should be balanced (often, five wheels recommended to allow easy movement but no tipping).

Feet should be flat on the floor. Use foot rests if chair adjustment is not possible; they should angle up to 15 degrees toward you.

Your lower back should be supported.

Armrests should be present. They should be adjustable and padded to minimize elbow stress.

Keep arms close to your sides regardless of whether or not they are used.

RISK: Keyboard is suboptimal, leading to upper extremity, neck, or other problems

Solutions:

Keyboard should keep elbows bent about 90 degrees and close to sides.

Tilt should be adjustable.

Experiment with different types of keyboards. Variations include keyboards that are rotated, split, or curved. (Research regarding benefit of this is still not conclusive.)

RISK: Mouse use causes pain

Solutions:

Your wrists should not be bent forward or backward at all when using the mouse; they should be in neutral position.

Some people find it easier to use a mouse with a trackball or touchpad.

RISK: Phone use leads to neck pain

Solutions:

Use a hands-free unit or speaker phone.

Vary phone use time with time spent doing other tasks.

Call using your computer, and follow the guidance for computer positioning.

Nursing staff can find guidance regarding safe patient handling and movement in the [Patient Care Ergonomics Resource Guide: Safe Patient Handling and Movement](#), a document developed by the Ergonomics Technical Advisory Group of the Department of Defense.

These simple suggestions are safe and easy approaches that may do much to enhance a person's health at work. Have people try just a few at a time, and keep exploring options as needed. Be sure to ask for support from ergonomics experts in the workplace.

Author(s)

"Improving Work Surroundings through Ergonomics" was adapted for the University of Wisconsin Integrative Health Program from the original written by J. Adam Rindfleisch, MPhil, MD (2014, updated 2018). Modified for UW Integrative Health in 2020.

This clinical tool was made possible through a collaborative effort between the University of Wisconsin Integrative Health Program, VA Office of Patient Centered Care and Cultural Transformation, and Pacific Institute for Research and Evaluation.



References

1. Commonly Used Statistics. United States Department of Labor, Occupational Safety and Health Administration website. <https://www.osha.gov/oshstats/commonstats.html>. Accessed June 18, 2014.
2. Definitions and domains of ergonomics. International Ergonomics Association website. <https://iea.cc/what-is-ergonomics/>. Accessed June 18, 2014.
3. Weber S. Healthcare ergonomics, part 2. *J Am Acad Nurse Pract*. Feb 2006;18(2):43-4. doi:10.1111/j.1745-7599.2006.00103.
4. Body Mapping Exercise. United States Department of Labor, Occupational Safety and Health Administration website. https://www.osha.gov/dte/grant_materials/fy10/sh-20856-10/Ergonomics-Body_Map.pdf. Accessed June 18, 2014.
5. Ergonomics: Human-Centered Design. Cornell University Ergonomics Web website. <http://ergo.human.cornell.edu/>. Accessed June 18, 2014.
6. Middlesworth M. A Step-by-Step Guide to the RULA Assessment Tool. Ergonomics Plus website. <https://ergo-plus.com/rula-assessment-tool-guide/>. Accessed June 18, 2014.
7. Computer Workstations eTool-Evaluation Checklist. United States Department of Labor, Occupational Safety and Health Administration website. https://www.osha.gov/SLTC/etools/computerworkstations/checklist_evaluation.html. Accessed June 18, 2014.
8. Safety and Health Topics: Prevention of Musculoskeletal Disorders in the Workplace. United States Department of Labor, Occupational Safety and Health Administration website. <https://www.osha.gov/SLTC/ergonomics/>. Accessed June 18, 2014.
9. Carpal Tunnel Syndrome Health Center. Web MD website. <http://www.webmd.com/pain-management/carpal-tunnel/ergonomic-workstation>. Accessed June 18, 2014.
10. Computer Work Stations. United States Department of Labor, Occupational Safety and Health Administration website. <https://www.osha.gov/SLTC/etools/computerworkstations/>. Accessed June 18, 2014.
11. Middlesworth M. 10 Office Ergonomics Tips to Help You Avoid Fatigue. Ergonomics Plus website. <http://ergo-plus.com/office-ergonomics-10-tips-to-help-you-avoid-fatigue/>. Accessed June 24, 2016.
12. The Comfortable Computing Top 10. Comfortable Computing Initiative website. <http://www.computingcomfort.org/educate1.asp>. Accessed June 18, 2014.