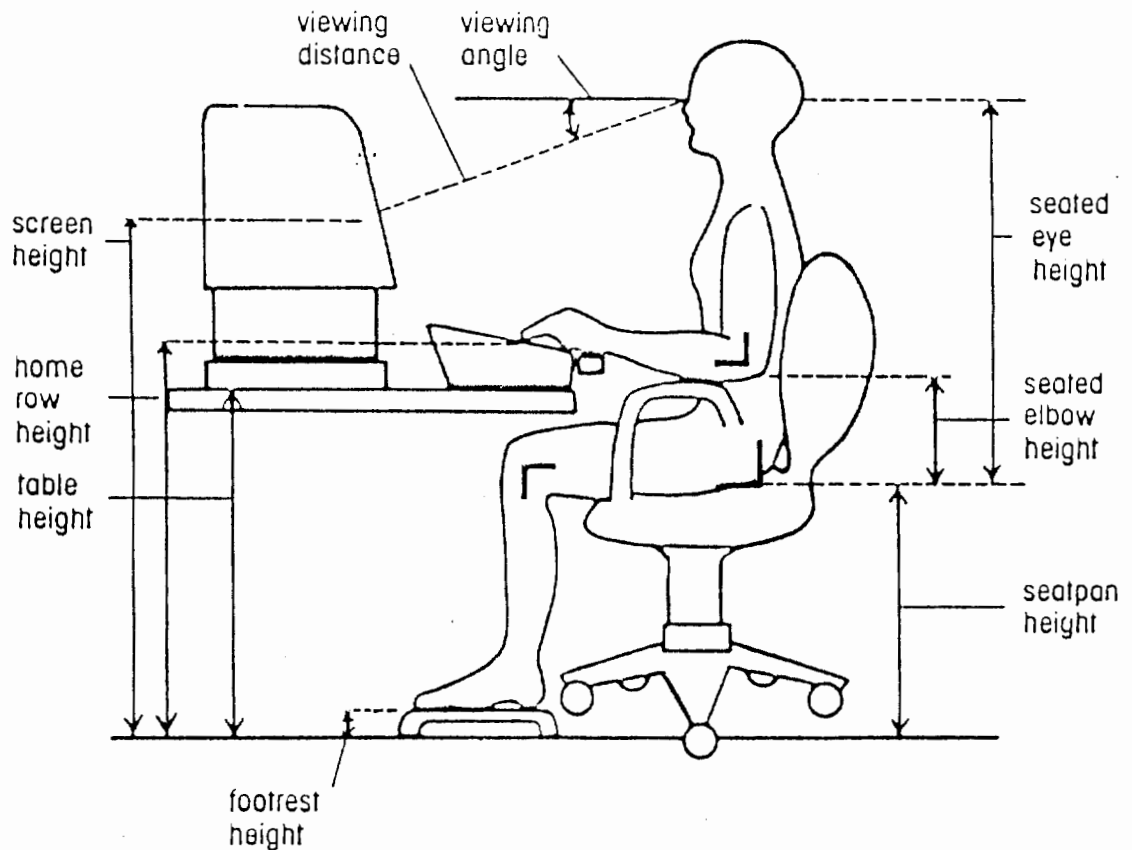


ERGONOMIC TIPS

by Marilyn H. Dainoff and Marvin J. Dainoff



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Ergonomics is the fit among the person, the tools, and the task (whether the task is data entry, cooking dinner, playing tennis, or whatever). It is human-centered; it means fitting the tools and the task to the human being -- not the other way around.

Ergonomist P. van Wely talked of ergonomics as an "eternal triangle linking efficiency, comfort and health."

Synonyms for ergonomics include user friendliness, human factors, and human engineering.

Ergonomics is associated with health and ease of doing whatever you are doing. It applies to everything you do at work and away from work. Ergonomic improvements in any area of your life will help you feel better in general!

CREATIVE ERGONOMICS

Be inventive! If you were setting up a new kitchen or workshop, you'd plan to have the things you use most closest to you. It is the same in the workplace. Ease, efficiency and safety are the goals. Here are some suggestions.

SOME GENERAL PRINCIPLES

- Listen to your body. If it hurts, think about what you are doing that may be the cause.
- The least effort (muscle work) is exerted when joints of the body are at or near the center of their range of motion.
- Motion which is repetitive or pushes at the limits of the system is potentially dangerous. Avoid all long-term asymmetric postures.
 - Use headphones or a good phone cradle if you can't hold your head straight up when you use the phone because of keying or writing.
 - Place monitor or copy, whichever you look at most, straight ahead.

Do not key while facing sideways, such as when sitting at a credenza or other worksurface which has no knee-hole.

SEATED POSTURE

- Seated posture is a compromise between the stability needed to do the task (such as keying), and the biologic need of the body for movement to maintain blood circulation to all parts of the body. Adequate blood circulation prevents the build-up of lactic acid, which causes pain.
- Lumbar lordosis (the forward curve of the spine at the small of the back) is healthy for the spine because it equalizes pressures on the spinal discs. The degree of curvature differs from person to person.

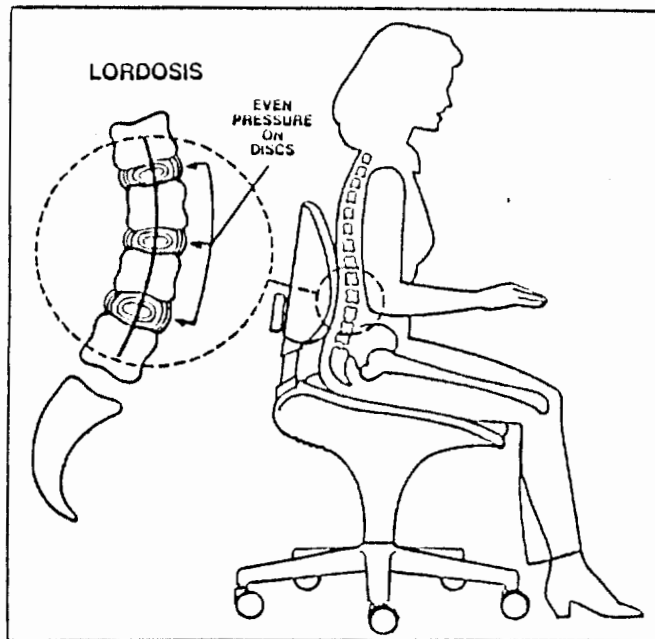


Figure 2. With forward seat tilt the spine is in its optimum posture with regards to minimizing uneven pressure on the discs, thus allowing the spinal column to be in equilibrium.

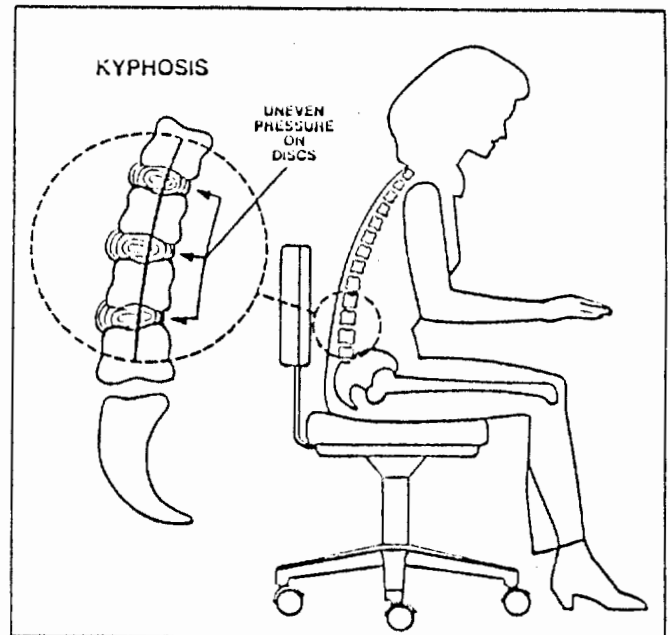


Figure 3. With non-tiltable seating, the flattened spine exerts excessive pressure on the spinal discs.

- Kyphosis in the lumbar region (a backward curve in the small of the back) puts uneven pressure on the discs, and leads to long-term wear and tear. Unsupported forward leaning (causing kyphosis) is almost as bad for the back as bending over from the waist and lifting a 22-lb. weight.
- Always try to maintain lumbar lordosis. When you sit, place the weight of the upper body on the backrest of the chair as much as possible, while maintaining lumbar lordosis.
- The trunk-to-thigh angle should never be less than 90 degrees.

- Prolonged fixed posture is neither comfortable nor healthy. Therefore try to vary your posture or even change tasks, if possible, as you feel tired.
 - One way to vary your posture is the following:
 - (1) When you are doing copy-intensive work, where you need to be close enough to read hard copy (which generally has small print), tilt your seatpan forward. This gets you close to your keyboard and your paper copy.
 - (2) When you are doing editing, proofreading from the monitor, or any work which does not require close vision, return your seatpan to horizontal and move the seat back to a reclining position. Whenever you are tired of one position, take a different, or intermediate, position. This helps promote your circulation, and prevents the fatigue and pain associated with prolonged fixed posture.
 - Try taking your phone calls standing up, pacing at the end of your phone line (you may need a longer cord). If you need to take notes while standing and talking on the phone, either have a high place to write, or sit down -- don't lean over to take notes (kyphosis).
 - Take a microbreak of a few seconds to stretch if you are aware of discomfort.
 - A lumbar support cushion may help if your chair/sofa/car does not provide enough lumbar support.

ARMS AND WRISTS

- The major risk factors for repetitive strain injuries in office work include awkward postures, repetitive actions, the force used in making the actions, and lack of adequate rest/recovery time.
- Remember the straw analogy about the carpal tunnel: do not bend the wrist in any direction if you can avoid it, especially during repetitive motions or motions requiring force.
- A wrist rest can be used to rest the wrist or palm during pauses in keying. The armrest of the chair is useful for resting the arm while phoning, talking, or doing other tasks, but generally not during keying. It is important, however, not to use the wrist rest or the armrests in such a way that the wrist is held in any position other than straight.
- Avoid resting the wrist against sharp edges of tables and desks.

- Avoid pounding the computer keys or writing with great force. Use the minimum force to get the job done.
 - Be keystroke efficient! Don't repeatedly tap a key if you can do the same thing by holding it down.
 - A keyboard on your lap may be better than one that is too high, but your forearm should not be below the horizontal while keying.
 - If the relationship between your seatpan height, worksurface height, and the floor is such that you can't get your arms, shoulders, and head into proper position, change the level of the seatpan, and/or use a footrest, seat cushions, and/or phone books or printouts to raise whatever needs raising.

UPPER ARMS AND SHOULDERS

- Keep the arms and shoulders relaxed. The upper arms should hang vertically from the shoulders, and the lower arms should extend horizontally for keying. The wrists and fingertips should not be more than 1-2 inches above the elbows. The elbows should not be lifted away from the body.

HEAD AND NECK

- Again, the neck should be kept in a neutral position -- neither with the head held down (as in looking at paper copy which is flat on a desk) nor with the head angled back (as with bifocal wearers trying to see a high screen.) The head should be held erect and the monitor should be such that the line of sight is about 10-20 degrees below horizontal (although values from 5-30 degrees have been recommended). Each situation is unique and must be evaluated from the point of view of your comfort and any glare you have on the monitor.

POSITION OF THE FEET, LEGS, AND THIGHS

- The lower legs should be erect, with the feet flat on the floor or a footrest.
- Avoid keying at worksurfaces which compress your thighs against the underside of the work surface.
- Pressure on the underside of the knees should be avoided; therefore the chair should have a waterfall front, and the seatpan should be shallow enough to avoid extending to the knee.

- Footrests can be fashioned from out print-outs or phone books taped for rigidity, or from 2 x 4s. Flat footrests are best.
- If your chair is height adjustable, adjust it daily, especially if the heel heights of your work shoes differ from day to day. It is also good to change the seatpan height when you change postures throughout the day.

EYES

- Put the copy at the same distance from your eyes as the monitor screen, and as close to the monitor as possible.
- Experts point out that monochrome monitors are easier on the eyes than color monitors. If you use a color monitor, pastels may be easier on your eyes than bright colors. Avoid particularly bright red on bright blue, and vice versa.
- The monitor screen is like a mirror -- it reflects glare and images. To minimize these reflections, the monitor should not be placed opposite a window or other light source. In addition, bright sources of light --such as windows --should not be directly in your field of view while you are looking at the monitor.
 - To check for glare, sit in your usual working position and look at your monitor while it is off. Look at your monitor as if it were a mirror: any reflection you see in it is glare, and glare is hard on the eyes. While it is still off, see if you can tilt or angle it, or move the monitor or the glare source, to minimize the reflections.
 - Minimize flicker from all sources. If your monitor flickers, see if turning down the brightness control helps. (Also, in general, use the brightness control!) If overhead lights flicker, try to get them fixed.
 - To rest your eyes from VDT work, try looking out into the distance for a few minutes.
 - For a temporary glare shield, attach a manila folder, or better yet, black construction paper, to the sides and/or top of your monitor.
 - Use books, discarded magazines or print-outs taped together, to lift or angle your keyboard or monitor.
 - A rigid ruler placed vertically between the keyboard and monitor can serve as a copyholder for light-weight materials.