

The User Friendly Office

an Office Organix™ Publication

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Raise your office consciousness.

It is easy to forget that today's all-pervasive computer environment is mere generations old. How quickly we've shifted from hunters to farmers to manufacturers to keyboard workers. Now a quarter of the workforce, some 26 million North Americans, spend the day working at a monitor.



Partly because the E-World is so new, many spend that day in discomfort at antiquated workstations. Workplace design hasn't caught up with more progressive thinking that sees a positive relationship between comfort and productivity. Former Secretary of Labor Alexis Herman said it best: "Good ergonomics is good economics."

Comfort pays and study after study shows a well designed computer office increases productivity, reducing employee turnover. Safe design is even more critical for independent workers with home offices since for them repetitive stress injuries could put the family income at risk.

Comfort levels from company to company vary dramatically as do levels of ergonomic sophistication. Management is often reluctant to improve the workplace thinking it costs too much and many cheered when OSHA office requirements were recently watered down. Office safety may require purchasing new equipment but more often than not, safety in ergonomics is a matter of properly using the

equipment already in place. An Office Organix national survey of workers in keyboard intensive offices found 80% lacked an understanding of ergonomic basics, like proper keyboard and monitor placement. Training issues are equally important, for example, getting workers to be aware of discomfort, not ignore it, and take breaks or corrective exercise action to eliminate discomfort.

With these thoughts in mind, take a fresh look at your office. Increased sensitivity to posture and equipment can transform your workplace into a oasis of comfort. Begin with eye comfort since glare is the single largest factor in worker time loss. More than half of all computer workers suffer from eye strain. It's the single biggest factor in work time loss.

LIGHT

The American Optometry Association recognizes a condition called Computer Vision Syndrome ("CVS") that affects users of "video display terminals" or monitors.

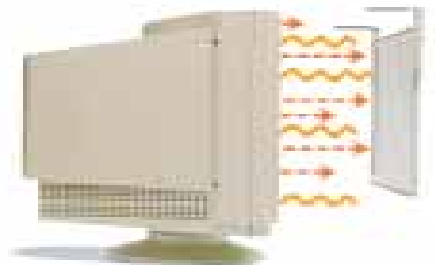
The condition generally isn't lasting but it impacts productivity. Symptoms include dry burning eyes, blurred vision, delayed focusing, altered color perceptions and headaches. Solutions include taking break a for a few moments at least every quarter hour.

Do you see reflections from light fixtures, windows or sunlight on your monitor? These reflections shine directly or indirectly in your eyes resulting in eyestrain. The solution is to lower the level of the offending light or remove it. Try not to face bright light sources in your field of vision. If you can't and must face sunlight for ex-

ample, try repositioning your monitor to avoid the glaring light or use a monitor visor.

Glare impacts the whole body, not just the eyes. When a screen reflects glare, the body unconsciously tries to dodge it, twisting and contorting the torso and neck to escape the offensive light. Over extended periods these distortions compound body stress and take a toll on nerves and bones. Consider your office walls too. Sharp white walls produce more glare than those with an off-white color or textured coverings. Avoid wall coverings with a light mirroring film.

One way to cut glare stress is to use an antiglare monitor filter with optically coated glass. Get one approved by The American Optometry Association that meets their glare reduction specs. Reducing the brightness and contrast adjustment on monitors to the lowest comfortable point is also kinder to your eyes.



Besides glare, certain screens also cut radiation and block up to 99.9% of ELF (externally low frequency) and VLF (very low frequency) electrical field radiation. Cheaper screens don't perform these functions or not as well.

“Good ergonomics is good economics.”

With concerns about electrical field radiation and its uncertain impact on the body, a flat panel monitor is a good precaution. Flat panels have little or no radiation and conserve desk space.

FLUORESCENT LIGHTS

Comparatively dim lighting is recommended for computer offices since strong light produces glare and eyestrain. More often than not, fluorescent office lights are too intense. Some newer fluorescent fixtures let workers adjust intensity but since most do not, a workaround is to dim the light by removing a tube or two from the fixture. Overhead lights are easily supplemented by localized task lamps.

Most fluorescent tubes lack the full spectrum of colors found in natural light and preferred by your eyes. Full spectrum bulbs are available and provide the missing spectrum colors (reds) and soften glare. You can also purchase tubes that cover your present fluorescent bulbs to condition the light. They are cost effective as they can be re-used. Still another solution is fluorescent light fixtures with parabolic louvers that diffuse overhead light, significantly reducing glare.

Since eyes get dry working at monitors, get in the habit of remembering to blink more frequently or use eye drops. During conversation the average person blinks 22 times a minute. Reading, you blink about 10 times a minute. Watching the monitor, the blink rate drops to 7. Eye drops stabilize the tear film. For long term use, avoid drops which contain decongestants. Take breaks every 15 minutes by merely looking away from the screen for a moment and focusing on a distant point.

EYEWARE

One inexpensive solution is specially coated Melanin eyeglasses that cut screen glare and equalize the surrounding light. If you wear bifocals or variable focus glasses, they impact computer work. Bifocals may require you to sit in awkward head positions to see clearly. Avoid tilting your head back to view the screen through the lower portion of glasses. If you use reading glasses, most are made to work at a distance of 10-12". Yet the recommended minimum distance for your monitor is 20"

or more. Talk to your optometrist about an alternate set of glasses with lenses adjusted to address this.

DOCUMENT HOLDERS

If you frequently look at books, papers or copy when you type, use a document holder. Place your copy at eye level next to your monitor or, even better, between the monitor and keyboard by means of a copy holder. The ideal document holders place your papers between the keyboard and the monitor, allowing line of site typing without neck rotation. If you type lines of copy or numbers, use a ruler to keep track from line to line. Some document holders have an electrically operated guide.

Minimize the distance to reach other papers, books, pens, your phone or other desk materials so you avoid reach stress.

PHONES

If you're on the phone a lot, use a headset or speakerphone to avoid cradling the phone in uncomfortable neck positions. A headset minimizes neck strain and wireless headsets leave you free to move about the office. Clamp-on phone arms free up desk space and let you pull the phone into place and further cut "reach stress".

MONITOR PLACEMENT

Place the monitor directly in front of you, not off at an angle. Viewing from an angle strains neck and shoulders. Some desks allow monitor placement below the work surface, visible through a "viewport". Others are "semi-recessed" placing the monitor half way into the work surface. These are often used in training rooms so students see both the monitor and the instructor.

Monitors should be positioned so the top of the viewing area is at least 10° or more below your forward line of sight. This keeps your head in a natural position, reducing neck and shoulder pain. The monitor should be about 20" away from your eyes. As monitor size increases, so does the desired distance between you and the monitor. You can also stretch your arms out towards the monitor and place the screen where your knuckles meet it.

KEYBOARDS

Proper position of arms and hands during keyboarding affects neck and shoulder comfort and importantly reduces stress on fingers, wrists and the carpal tunnel. In sitting position, keyboards should be at the same height as your elbow so arms are parallel the floor. You want about a 90° angle between upper arms and forearms. If you work standing, the keyboard may be positioned lower than this, forming as great as a 120° angle. Like the monitor, the keyboard should also be directly in front of you, not off at an angle requiring you to "do the twist". Research shows even good typists spend more time looking at the keyboard than was heretofore thought. This further adds to neck stress which proper keyboard placement reduces.

Keyboard angle is important and if your keyboard has fold out back legs, we recommend that you do **not** use them. They increase wrist displacement and strain. While it takes practice, ideal keyboarding hand position should be like piano playing. "Float" your wrists above the keyboard at least some of the time. This habit also helps you think about the amount of pressure you put on your wrists.

Avoid what we call "triangulation", using your wrists to hold your upper torso up as you tend to slump forward after long hours at the keyboard.

If we were to prioritize dangers for intense computer users, improper mousing would head the list. Second would surely be using wrists for upper body support. Placing the keyboard too high is the third major stressor.



“Office health is a dual responsibility. It takes both staff and management to implement change.”

When you type, your hands should be in a straight, neutral position. Do not angle the wrists, sloping downward as that increases strain. Don't anchor your wrists on your work surface or the palm rest as doing so bends your wrists back and increases pressure on their underside. Palm rests should be used during pauses, not while you are typing.

If you are a hunt and peck typist, be aware that this causes a repetitive movement back and forth between the keyboard and the monitor. Learn touch typing and you minimize this stress.

Better keyboards are shaped to accommodate a natural wrist position. Keys slope so you do not have to twist wrists to fit the keyboard. Some models allow you to tilt keyboard sections as much as 90 degrees, or to place key pad sections apart to match your shoulder span. There are one handed keyboards for special needs individuals or for graphic artists who prefer to type with one hand and air brush with the other.

As an alternative to keyboards entirely, voice activated software is a powerful ergonomic aid but the state of the art is still such that too much time is spent on correction.

KEYBOARD TRAYS

Proper placement is often enhanced with a quality keyboard tray. The good ones both height adjust and pivot to provide negative (or positive tilt). Some roll beneath the desk when not in use so you can work at the front of your desk for non-computer work. Some keyboard tray arms raise above the desk for use in standing keyboarding position.



Tray arms mount underneath the desk on tracks and the longer the length of the mount track, the better the keyboard stability. Tracks with ball-bearings are better

than those with nylon glides since over time nylon gets dirty and tends to stick. Trays should be wide enough to accommodate both the keyboard and the mouse, about 27" or wider.

There is an amazing variety of keyboard trays. Some are keyboard specific, for example to match the shape of a Microsoft Natural or to take a digital pen tablet. Others offer mouse platforms that rotate below or above the keyboard surface. Most offer palm pads. Sit to stand keyboard trays combined with a vertical monitor riser, let a worker relieve lower back stress by altering between standing and sitting postures.

THE MOUSE AND OTHER INPUT DEVICES

Few devices are more critical in repetitive stress evaluation than the mouse, the identified factor in 66% of stress injuries. Injury typically happens when over time the wrist is deflected (angled) to hold the mouse. Mousing on a work surface too high for the user is similarly stressful. Extreme arm rotation and a forward "flexion" of the shoulder occurs. The result is wrist over tension and a tendency to "park" the whole weight of the forearm on the palm or wrist.

A group of use tactics is suggested to reduce mouse induced wrist and finger stress. The most important of these is placing the mouse as close in to the keyboard as possible rather than mousing with it off at some distance to the right or left of the keyboard. The more the wrist is twisted during mouse operation, the more stress increases - geometrically.

Mouse using full arm motion rather than making the wrist do all the work. Place the mouse close to you so you don't have to stretch for it. Increasing mouse acceleration by adjusting your software control panel reduces mousing effort. If you are left handed, use your software to switch button assignments. Execute commands using software key strokes instead of the mouse. Use two hands rather than contorting one to reach the command keys.



Clean the mouse ball (or the feet on an optical mouse) to reduce drag. Keep the mouse cord free and loose so you do not have to yank it free to use it. Or use a wireless mouse but if you do, keep its batteries fresh. Some wireless mice require batteries that are so heavy they make moving the mouse stressful. Other wireless mice work on a tablet, do not require a battery, and move with less drag. Don't continue to clutch the mouse when it is not in use but relax your hand in your lap instead.

There are a wide variety of mouse alternatives, some well known like trackballs and touchpads. Others offer new technology or designs. Some read hand gestures to execute a wide range of commands. There is software that let you mouse by following eye movements. There are feet operated mice and foot pedals that supplement mouse actions. There are mice you hold vertically and some mice come sized to your hand and are made for left or right hand users.

We recommend switching among multiple input devices. This tactic shares stress over different hand, finger and wrist areas. Use a mouse one day, a trackball the next, and maybe a foot operated mouse the next. Use foot pedals to share the work load with the wrists.

A simple device called a mouse bridge fits over the numeric portion of a keyboard so your wrists mouse without bending but it is not recommended if you frequently use the numeric keys.

“Half of ergonomics is good body consciousness.”

CHAIRS

Thirty to forty percent of workers' compensation claims are lower back related. While lifting is the key claim factor, seating posture and equipment are significant factors too.

Use a chair with enough adjustments to achieve desired support. You want to be able to tailor the chair to each user's posture. Chair adjustments help you achieve a "neutral gravity" position, putting the minimum possible stress on vertebrae and muscles and especially on the lower back. The chair back should support the body and chairs allowing seat depth and back height adjustment offer added tailoring, some with inflatable lumbar support.

Minimally adjustable chairs lack the flexibility better engineered ergonomic chairs provide. Amortize the cost of a quality chair over its warranty life of five to ten years and its benefits become justifiable. Different chairs provide solutions for different tasks but our focus here is on computer office use.

Look for these key adjustment features. Ideally the chair back will adjust both vertically, up and down, and horizontally, in and out, to contour the chair to each user's back. You can alter the seat pan depth at the same time. The chair back should adjust to match the contours of your spine. Some chairs offer pump-up lower lumbar support or adjustable mechanical lumbar rest mechanisms. Duo-back chairs have two kidney shaped backs and provide excellent back support during lateral movement.

Most chairs provide pneumatic height adjustment. Extra short or extra tall cylinders are available to alter the height range for the very tall or short. Most chairs have a weight restriction that effects the warranty. Permissible weight



generally tops off at 250 lbs. For extra large or heavy individuals, there are “big and tall” chairs with limits to 500 lbs., designed for people up to 7' tall. Chair warranties are usually based on “single shift” or 8 hour daily use. Most chair warranties offer free replacement if parts fail during the warranty period.

The chair should adjust so the seat front does not protrude into your calves. Consider the seat contour as well. Some seats are heavily contoured, very high in the middle, and look almost like a “saddle”. Others are nearly flat. Saddle or tractor seats cover more body surface and are initially quite comfortable. However they tend to restrict body movement and that inhibits circulation.

Chair arms have come a long way. The best ones will height adjust vertically, adjust width wise and some even rotate clockwise and counter clockwise. Some arms swing behind the chair permitting work close to the desk. We prefer “T” shaped arms for computer use. Some arms have a gel covering. Some telescope in and out to extend arm support. Some chair arms have cups to rest your arms in. These flow and move as you do, providing added support to reduce “reach stress”. There are chairs with keyboards built into the arms.

Consider chair fabrics too. It is a myth that more expensive grades are more durable. Fabric upgrades on better chairs relate to fashion, not durability. Manufacturers rate durability with “double rub” ratings. The least expensive grade can still have a high “double rub” rating. One double rub is the amount of wear the fabric takes from sitting down and standing up once. A double rub rating of 20,000 means you can sit down and stand up 20,000 times before the fabric should show signs of wear. Double rub ratings under 20,000 are on the low side. Double rub ratings over 200,000 are on the high side. Some fabrics have ratings as high as 1,000,000.

Because heat is a factor in stress and discomfort, fabric is preferred over leather which is more heat retentive. There are fabrics that are knits rather than weaves. The knits are soft yet durable and they are good at disbursing heat. Mesh chairs are

the best of all at not retaining body heat.

Kneeling chairs provide relief from lower back stress by shifting back stress to shin pressure. They help keep the spine in proper “S” shape. Kneeling chairs are useful if you switch back and forth between a standard chair and a kneeling chair. We do not recommend kneeling chairs for full time use as they create too much pressure on shins and that inhibits circulation.

Some new chair models have the ability to let you sit in standard seated, kneeling, perching and even support you in standing position. Others have automated mechanisms that shift when you do to insure you do not remain in an unhealthy, static position.

It goes without saying the adjustment features on chairs have to be used frequently to be of benefit. Yet many office workers set them once and never use them again. Many would use their mechanisms more if they knew how, but were never shown.

DESKS

Desks have come a long way from the old 29” high steel box. Newer designs offer a surround style, human-adaptive work surface and the ability to adjust surface height. Better desks make it easy to frequently change keyboard height and tilt angle and to change work surface and monitor surface height.



Many height adjustable desks are ADA compliant, allowing wheelchair access. Some have the height adjustment range to accommodate sitting or standing position work. Height adjustable desks use a variety of mechanisms from electric motors, to cranks, to pneumatic lifts to counter-

balanced weights to alter worksurface height. Desk options should include a convenient place for the CPU so it's easily reached, drawers and file holders. Some desks have built in lighting and powerstrips with surge protection.

INTEGRATED WORKSTATIONS

Intense computer workers like programmers or graphic artists may want an integrated workstation. These are single units that incorporate all major workstation elements: a chair, a CPU and monitor holder, a footrest, a height adjustable keyboard holder and often shelf space for papers and peripherals.



Such workstations provide an integrated design so all these elements work well together. They have the disadvantage of being less easy to egress, so they are not ideal for someone who needs to get up constantly. Some units move electrically so the entire workstation moves like a space capsule, rotating into different work positions. Some fit over your existing chair or recliner so you can work in a supine or "neutral gravity" position. Some work over a bed and are a critical solution for workers with severe back discomfort.

FOOTRESTS

It is best if your feet rest firmly on the floor as you work. They shouldn't be tilted with heels up and toes pointing to the floor. If you use a footrest, it should be wide enough to accommodate your shifting positions and movement. A foot rest helps prevent you from working in a slouched forward position and helps the legs support your back. Some footrests have massage balls in them. Others offer electrostatic dissipation if this is needed in your workplace.

Avoid storing things under your desk if doing so blocks your movement or limits leg room.

MEDICAL

Some are more prone than others to RSI's. Factors that contribute to being at risk are one's general physical shape and genetics. If you have arthritis, diabetes, a thyroid condition, vascular disorders, excessive weight, or if you smoke, all these increase your RSI risk. Sensitivity to discomfort at the computer is another important factor. As this sensitivity grows, you grow more aware of what you need to eliminate discomfort. Sometimes that need is for equipment. Just as often a simple change in posture or taking momentary breaks or relocating a computer peripheral will solve the problem.

SOLUTIONS WITHOUT COST

While ergonomic equipment is important, many solutions require no equipment expenditure at all. For example proper placement of existing equipment costs nothing and offers critical benefits. Postural education may be even more critical. Take the myth that good posture is "sitting up straight".

If you are seated at the keyboard in a 90° position, as the minutes and hours pass, there is a tendency for the bodies' gravity balance point to slump forward. Neck and shoulder muscles have to compensate and strain to keep the body from falling forward. Muscles in the front neck stretch and weaken and others have to hold up the arms. Vertebrae get compressed. Blood flow is inhibited.

So workers need to learn that sitting up straight for hours is not good posture and not to sit statically in any one position but to shift between many. This noticeably reduces the physical load on the intervertebral discs as well as the strain on the back muscles. Your chair's back rest should not always be set ninety degrees to the seat but you should alter it frequently and at times even recline it. The point is that office safety is often achieved without the expense of new equipment.

FIDGETING

Graphic designers, programmers, writers and other intense computer workers tend to be what Office Organix call "concentrators". They tend to sit statically for hours, lost in the complexities of their task. But static, same-position keyboarding is terribly hard on the body whereas fidget-

ing and frequent movement is healthy. Breaking at regular intervals is important. Learn the critically important discipline of turning away from the task at least once a half hour.

Stand up and move the body, neck, arms and legs. Shake out the arms and hands. Take eyes off the monitor and blink. Swivel the head clockwise and counterclockwise. Stretch out the arms and raise them above the head. Movement is helpful and even small movements enhance comfort by stimulating circulation and shifting body loads to different muscle sets. Movement costs nothing and may be even more important than quality equipment for keeping you healthy.

If you are a "concentrator", consider software that reminds you to take a break. Based on predetermined minutes or a specified number of keystrokes, it will alert you when a stretch break is needed. Some software talks you through a choice of exercises based on each worker's needs and preferences. Even more powerful software monitors entire networks of staff and helps identify at risk individuals.

TO YOUR HEALTH

If you take away one point from this flier, let it be this. Be sensitive of your body while you work at the computer. Be mindful of the stress it takes and treat it with respect. Take corrective action when it alerts you it is suffering. Such consciousness today pays off tenfold as you age and the rewards go to both individual workers and businesses.

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Note: work related discomforts are serious ailments and should be treated by a physician. The suggestions on our site are not intended to replace or substitute for the care of your physician. Consult your physician if discomfort occurs. **Office Organix** is located at 47 Farrington Road, Montauk, New York 11954 or visit our web site at www.officeorganix.com. For our catalog of keyboard office health and ergonomic products, call 800-569-9236. **Interactive safety tips** are available at www.officeorganix.com. Just click on Interactive Office Tips. For a directory of ergonomic professionals by region, click on [Ergonomic who's who](#).

Office Organix Guide to Workstation Ergonomics



1 Top of the monitor viewing area is 10 degrees or more below forward eye level.

2 Work 20 inches or more away from the monitor. Distance increases with monitor size.

3 Keep office walls in soft colors. Use low intensity room lighting supplemented by localized task lighting. Use a monitor glare filter or computer eye glasses. Use blinds or curtains to stop sunlight glare. Use full spectrum light bulbs. Use eye drops to keep the eyes moist and "blink" more often.

4 Keep wrists positioned as a natural extension of the forearm, not angled up or down. The upper torso should not be supported by the wrists.

5 When typing, the forearm should be parallel to the floor. The elbow is relaxed. Keyboard is flat at elbow level. Work the mouse close into the keyboard and minimize wrist deflection. Let go of mouse when not in use. Use the full

arm to mouse. Keep the mouse ball or mouse feet clean and the cord free. Use software command alternatives instead of mouse when possible.

6 Use a document holder at the same angle as the monitor screen, placed between screen and keyboard.

7 Rest feet firmly on floor or support the feet with adjustable footrest.

8 Chair should have ergonomic adjustments including seat height, seat depth and adjustable arm rests. The seat pan should be positioned so it does not protrude into legs.

9. Don't stay stationary working in a single, static position. Shift seat positions. Take breaks. Relax a moment. Rotate your neck. Stretch out and relax your fingers.

Above all listen to your body and be conscious of its discomforts. Take corrective action promptly.