Pros and Cons of Ergonomic Office Equipment

All "ergonomic" items have some drawbacks or possibilities for misuse. Many ergonomic problems can be fixed by rearrangement, adjustment or modification of existing items.

Keyboard Trays

Purpose: What the gizmo is supposed to correct	To adjust the height and angle of a keyboard in order to fit the person or allow posture change To allow a better viewing arrangement by moving the person back from the screen or worksurface
Possible Drawbacks or Misuse: How the gizmo can actually do harm, potentially	The mechanism reduces knee clearance. For some keyboard trays, there is only enough room for a keyboard, forcing a long reach to use a mouse. Keyboard trays can be adjusted too low, too high, or at the wrong angle, causing bent wrists
General End-User Instructions: For the person who's going to use the gizmo. Adjustments and work habits	The purpose of this device is to adjust the height and angle of the keyboard and mouse. The best height for the keyboard is generally about at elbow height or lower, but nearly any height is acceptable if it is comfortable. The angle of the tray/keyboard is as important as its height. Adjust the tray so the keyboard is approximately at the same angle as your forearm; for a low keyboard this may mean tilting the keyboard slightly backward.
Choices: Some of the options available out there in the marketplace	Height adjustability is a critical feature in most cases. Maintenance adjustability or fixed-height devices may be acceptable, if keyboard use is light. If mice are consistently used, the tray should feel stable and hold the mouse as well as the keyboard. A wrist rest should be available but may not be necessary. Angle adjustability will allow more precise matching of the keyboard angle to the forearm angle. Backward angles may be preferred by some users. The tray or mechanism should not interfere with the knees or posture. Most of the lever- type controls can be adjusted to change the lever angle. This is usually done by pressing a button on the top of the lever. Some trays have special installation requirements, such as a minimum worksurface depths. A few can be installed in right-angle corner workstations. There is nothing sacred about keyboard trays. An alternative is to place both the mouse and keyboard directly on the worksurface and adjust the worksurface to an appropriate height.

Wrist Rests

Purpose: What the gizmo is supposed to correct	To prevent the wrist from dropping (bending back) while keying during keying pauses, or while mousing To take some weight off the shoulders and reduce shoulder muscle work To soften the surface under the wrist
Possible Drawbacks or Misuse: How the gizmo can actually do harm, potentially	A too-thick or too-high wrist rest can cause forward flexion of the wrist. Some individuals may become dependent on wrist rests and may bend their wrists to reach side or bottom keys rather than move their forearms Wrist rests with sharp edges, even foam ones, may be uncomfortable Wrist rests of any design may cause pressure inside the carpal tunnel in some people.
General End-User Instructions: For the person who's going to use the gizmo. Adjustments and work habits	When in use, the wrist rest should keep the wrist straight rather than bent up or down. A wrist rest is usually placed immediately in front of the keyboard or mouse. However, the position is up to you --- some people push the keyboard back and use the wrist rest under their forearms. Some people's wrists are sensitive to pressure underneath them. Others are sensitive to pressure underneath the palm. Find a spot that is comfortable for you. Wrist rests for keyboard should be used mainly during pauses. While keying, use the rest lightly, and move your whole hand to reach side keys rather than bending your wrist sideways.
Choices: Some of the options available out there in the marketplace	Thickness of the rest should be about the same as the front of the keyboard. The rest should be deep enough (front to back) to spread the load out over a large area. Less than about two inches is considered too narrow. Wrist rests should not have sharp edges in contact with the skin. Rests do not necessarily have to be soft if contours and size distribute pressure well. Material should be cleanable or the rest should be cheap enough to be discarded when soiled. Breathable material is more comfortable in warm or humid environments. Material should not have too much friction; should not constrain the arms. Anti-static features are useful if properly grounded, and if static has been a demonstrated problem. Wrist rests for mice should move (slide, roll) with the mouse.

Mouse Support Trays

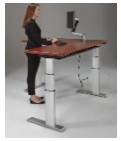
Purpose: What the gizmo is supposed to correct	To reduce reaching by allowing a mouse to be used near the keyboard, if a keyboard tray is used.
Possible Drawbacks or Misuse: How the gizmo can actually do harm, potentially	Adding a mouse extension to many keyboard trays makes them feel unstable or jiggly.
General End-User Instructions: For the person who's going to use the gizmo. Adjustments and work habits	The purpose of this device is to adjust the height and angle of the mouse so the mouse can be used with a straight wrist. The best height for the mouse is generally about at elbow height, but nearly any height is acceptable if it is comfortable. It doesn't have to be at the same height as the keyboard. Many people who use a mouse heavily prefer to rest their whole forearm while mousing. This is fine, but be careful of resting the elbow and the funnybone nerve on anything hard or sharp. Also, when mousing, try to sometimes move the mouse with the whole forearm, keeping the wrist straight. At other times, keep the forearm still and move at the wrist. The point is to not overdo any one method.
Choices: Some of the options available out there in the marketplace	Mouse trays usually take the form of an extension on a keyboard tray or a "breadboard" on a worksurface, but can be a separate table or stand. An alternative to mouse trays is to place both the mouse and keyboard directly on the worksurface and adjust the worksurface to an appropriate height.

Alternative Keyboards and Alternatives to Mice

Purpose: What the gizmo is supposed to correct	To use different muscles during keying or mouse. To reduce awkward postures of the arms or hands during keying or mouse. The main target postures are deviation (sideways bending at the

	wrist) or pronation (working with palms facing the floor).
Possible Drawbacks or Misuse: How the gizmo can actually do harm, potentially	Some users find it difficult to adapt to new keyboard shapes or mouse alternatives. Error rates usually increase and speed slows. Most typists eventually return to their original accuracy and speed. Often, a wrist rest needs to be reshaped to fit an unusual horizontal or vertical angle of the keyboard. Inexpensive raw-foam wrist rests are a good solution because they can be cut. Some alternative devices use thumb motions frequently and can tire the thumb or cause tendinitis. There is no evidence (yet) that trackballs, etc. are healthier or unhealthier than mice. The main problem is overuse regardless of the kind of device. The best approach may be to switch back and forth frequently from one kind of pointing device to another. For Macs, this is easy because Macs support several devices without having to plug/unplug.
General End-User Instructions: For the person who's going to use the gizmo. Adjustments and work habits	Get used to alternative devices slowly. If discomfort develops, it may be due to the new design. Evaluate the situation carefully. For pointing devices (mice, trackballs, styluses, touch pads), consider switching back and forth between different kinds of devices, rather than completely replacing one device with another.
Choices: Some of the options available out there in the marketplace	For keyboards, current choices are split and/or angled keyboards. Keyboards that adjust from a closed position allow users to use the board in the usual way, or to gradually adapt to new positions. For mice, choices include trackballs, roller mice, mouse pens, mice that use one finger, and touch tablets, plus a wide variety of mouse shapes and sizes. When choosing alternatives, evaluate whether the alternatives truly use different muscles. Having a variety of keyboards and pointing devices available to users often produces the best results.

Height-adjustable tables and work surfaces



Purpose: What the gizmo is supposed to correct	To fit different-size workers, or different postures for the same workers. To allow users to alternately key and write on the same surface without slumping or hunching their shoulders To reduce back problems by allowing users to alternate standing and sitting during the day.

Possible Drawbacks or Misuse: How the gizmo can actually do harm, potentially	Expense. Standing for too long can lead to lower back, foot and leg pain. Standing and sitting heights must be adjusted properly for user or wrist, neck pain can occur. Some on-the-desk models take up much space on the desk. Some models will drop if leaned on while typing.
General End-User Instructions: For the person who's going to use the gizmo. Adjustments and work habits	Tables (and the work or equipment on them) should be at a height where you can easily key with straight wrists and read or write without either slumping forward too much or hunching up your shoulders. For most people, keying and writing are done at different heights --- many people prefer a writing surface that is a little higher than the typical keyboard surface. Getting a work surface at the best height for you is more difficult than it sounds. There may be three different "right" heights: the right height for your forearms and shoulders (no pushing up of shoulders), the right height for your eyes and head (putting the work at a good viewing distance that avoids slumping), and the right heights for your legs (allowing you to sit the way you like, which may including crossing your legs). The right height for you may be very different from the right height for another person who is as tall as you. A lot depends on whether you are long-waisted, nearsighted, short-armed, and so forth.
Choices: Some of the options available out there in the marketplace	Height range (from a few inches to full sit-stand range) should be matched to the situation. Generally, a person changing from sitting to standing needs a maximum of 20 inches of height adjustability from their seated elbow height to their standing elbow height. Also, a diverse group of seated people has about a 5 inch difference between the lowest elbow height and the highest elbow height in the group. Maintenance adjustability is usually acceptable for people who do the same task most of the time. Multiple users at the same workstation should have user adjustability rather than maintenance adjustability. (Options include from crank, electrical, or counterbalanced mechanisms.) Especially for multiple operators, tables that display the height setting make it easy to find a favorite setting. Work surface edges can be important to comfort for people who read or write frequently (Edges can be rounded, sloped, or cushioned)

Monitor arms

Purpose: What the gizmo is supposed to correct	To free up work surface under the monitor. To allow forward- back or sometimes up-down movement of the monitor to accompany posture changes or fit different users. To allow movement of the monitor by the user to be viewed by others
Possible Drawbacks or Misuse: How the gizmo can actually do harm, potentially	For many users, monitor arms put the monitor up higher than recommended (the top of the screen area should be no higher than eye height). An arm with keyboard storage can stress the back when lifting the keyboard onto its bracket.
Choices: Some of the options available out there in the marketplace	Height and in-out range should be matched to the situation. In general, the lower the monitor can be held, the better. The size of the tray and weight capacity should be matched to the monitor. Friction vs. crank vs. spring- counterbalanced height mechanisms affect usability if the individual(s) needs to frequently adjust height. Spring-counterbalanced, if well adjusted, is the easiest to use. Different means of attachment (worksurface clamp, grommet, floor) should be matched to the situation.

Glare screens

Purpose: What the gizmo is supposed to correct	To improve screen visibility by reducing bright spots or washout caused by ambient light on monitor screens. Glare screens DO NOT reduce the magnetic fields that are currently (and controversially) of concern. No glare screen does this, despite misleading claims.
Possible Drawbacks or Misuse: How the gizmo can actually do harm, potentially	Mesh screens can collect dust and obscure the image Optically coated ("anti-glare coating") screens can be difficult to keep clean.
General End-User Instructions: For the person who's going to use the gizmo. Adjustments and work habits	Once the glare screen is installed, increase the brightness of the monitor as necessary to compensate for any darkening caused by the glare device. Know the appropriate cleaning procedures and keep the screen clean. Glare screens can only do so much. Reducing light sources around you may be necessary. If a window is causing screen glare, consider

	changing the location of the monitor. If your monitor is right in front of a window, you may not be experiencing glare but you may get eyestrain from having too much contrast in your field of vision.
Choices: Some of the options available out there in the marketplace	Mesh, polarized, optically coated. Screens that are both polarized and optically coated cause much less distortion than mesh screens. Polarized screens are not very effective when used over a monitor with frosted or etched glass There are different grades of optical coatings. In general, a purplish (rather than green or blue) reflection is the best quality. Screens that fit more than one monitor size are more versatile in the long run. Grounded screens can reduce static electricity (dust buildup). Many people confuse static electricity with controversial magnetic fields. Jargon in ads (H-field, E-field, VLF/ELF, etc.) helps perpetuate the incorrect idea that magnetic fields can be reduced by these products.

Document stands

Purpose: What the gizmo is supposed to correct	To reduce distortion of print that happens when a document is slanted away from the eyes. To avoid neck twisting by bringing the document close to the monitor and keeping it at a readable angle. To reduce eyestrain by keeping the document at approximately the same distance and angle as the screen.
Possible Drawbacks or Misuse: How the gizmo can actually do harm, potentially	Freestanding types can sometimes get in the way.
General End-User Instructions: For the person who's going to use the gizmo. Adjustments and work habits	Angle the document stand to aim the copy straight toward your eyes. It should be as close to the side of the monitor as possible, to minimize looking from side to side. The document should be at about the same distance from your eyes as the monitor is (assuming the monitor is at a good, readable distance). There is little evidence regarding whether the document should be at the same height as the monitor, but a too-high document (or monitor) can cause neck and shoulder tension. If most of your work involves looking at paper rather than at the screen, consider putting the paper in front of you, rather than the monitor. For these jobs, a document stand is essential.
Choices: Some of the options available out there in the marketplace	Size and weight capacity should be matched to the documents used Method of mounting (base, articulating arm, monitor attachment) affects usability Depending on needs, the user may prefer a stand that can easily be moved out of the way. People who flip pages frequently may dislike a stand that has a lip along the bottom edge Some people may prefer a line guide, and people working from columns of numbers often need a line guide that moves by the action of a foot pedal.

Task lights

Purpose: What the gizmo is supposed to correct	To reduce eyestrain or "peering" postures by illuminating paperwork and reducing the need for bright ambient light that may cause screen glare or increase the contrast between the screen and its surroundings.
Possible Drawbacks or Misuse: How the gizmo can actually do harm, potentially	Some task lights in some situations can cause glare on the screen, can shine directly into workers' eyes, or can illuminate the area around and behind the monitor too brightly. Different people need or prefer different lighting levels. Task lights without dimmers may not meet individuals' needs.
General End-User Instructions: For the person who's going to use the gizmo. Adjustments and work habits	Use task lights to illuminate documents while avoiding illuminating the screen or the area around the screen. The task light bulb should not be visible to you when you are in your normal working position. If it is, shield the bulb or move the fixture. Documents should be illuminated enough to be easily readable, but too much light on documents can result in a strong contrast between the brightnesses of the screen and the document. This kind of contrast can cause eyestrain.
Choices: Some of the options available out there in the marketplace	Lights on movable arms provide more flexibility in the location and even the quantity of light Task lights with dimmers or multi-way switches allow individual adjustment Lights should evenly diffuse light over an appropriate area and should not shine into users' eyes.

Footrests

Purpose: What the gizmo is supposed to correct	To allow different positions or movement of the legs and feet.
Possible Drawbacks or Misuse: How the gizmo can actually do harm, potentially	Footrests are often used to compensate for a chair that is too high, substituting for more appropriate measures such as lowering the chair and/or worksurface. In these situations, footrests do support the legs but do not allow a full range of leg postures and the individual may find it difficult to move around the office while seated.
General End-User Instructions: For the person	Change foot position often. Stretch out your legs, tuck them under the chair, move them from side to side. Use the footrest to put your feet up from time to time. As long as you don't feel unstable or cramped, most foot positions are fine.

who's going to use the gizmo. Adjustments and work habits	
Choices: Some of the options available out there in the marketplace	Footrests can have different degrees of adjustability, motion, and texture. Footrests should not cause the foot to rest on sharp or hard edges. Big footrests give more choice of leg posture. Footrests should be stable enough to stay in place but mobile enough to be moved when by the feet when needed. Footrests that allow exercise or massage the feet may be beneficial.

Adjustable seating

Purpose: What the gizmo is supposed to correct	To fit different workers, or different postures for the same worker. To avoid back pain by supporting multiple postures and/or "good" postures; to reduce muscle effort required in sitting.
Possible Drawbacks or Misuse: How the gizmo can actually do harm, potentially	Cost. Adjustments can be confusing without instructions. No single chair is preferred by all users; many chairs and chair features can be uncomfortable Size extremes (very small or large people) are virtually ignored by the seating industry. There are only three or four office chairs appropriate for these people.
General End-User Instructions: For the person who's going to use the gizmo. Adjustments and work habits	All adjustments and their purpose should be explained to the end user and posted in a central place. General adjustment procedures are explained in the following section.
Choices: Some of the options available out there in the marketplace	Multitudinous. Many adjustments are on the market: backrest up-down, backrest in-out, backrest angle, armrest up-down, armrest in-out, seat up-down, seat angle (including forward tilt on some models), lumbar support depth, type of seat height mechanism, tilt lock, tilt tension, type of recline (knee tilt, column tilt), etc. Each adjustment can have its own character: range, ease of adjustment, stiffness.

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