



ErgoSense

Issue 19

Ergonomics for the Laptop User

Today's Laptop computer is really an amazing piece of equipment. With speed and power to rival many desktop units it has become the computer of choice for a growing number of users. Laptop purchases account for nearly one-third of the PC market and that share is increasing every year. The small size, high power processors, and large storage capacity make it popular for people who need to take their work with them.

While the laptop computer seems like a great choice for many people, it does pose some potential ergonomic risks to intensive users. If the laptop is only used occasionally there is little risk. However, when used or transported for long periods, there is a potential for neck and shoulder discomfort, sore arms and wrists, and eyestrain.

Transporting your Laptop

Even though contemporary laptops are lighter than their predecessors, they are still heavy enough to strain the neck and shoulders. If you transport the machine long distances such as down long concourses at an airport, or down the block to a parking lot, a two-wheeled utility cart or wheeled luggage is strongly recommended. A cart with larger wheels will generally roll easier than one with smaller wheels. The machine needs to be well padded to protect it from vibration and shock, but using a cart can save the neck and shoulders from the strain of carrying the computer.

If you must carry the machine we recommend a computer case with a wide, padded shoulder strap and a rough, high-friction exterior on the actual computer bag. A high-friction material such as the cordura nylon used on luggage and outdoor clothing will "cling" to your body and transfer some of the weight of the computer to your sides and hips with less strain remaining on the



shoulders. It is also helpful to wear the bag like a mail carrier or bicycle messenger – with the shoulder strap over your head and going diagonally from one shoulder to the opposite hip. This gives the bag and strap lots of “contact” with your body and helps to redirect the weight away from the shoulder.

When loading the laptop into your car place it in the back seat as opposed to reaching the computer across the center console to the passenger seat. By using the back seat you can keep the load closer to the body and keep the hand below the shoulder. This places less strain on the shoulder joint than reaching the computer case across to the passenger seat.

Laptop Computers – Convenience Vs Ergonomics

The small size of contemporary laptops is appealing to many people, but it quickly turns into a liability when actually using the computer. Laptops are inherently difficult to set up so that they are ergonomically correct. Because the keyboard is small and very close to the monitor, it is difficult for most users to correctly place them. For example, if you lower the machine so the keyboard is correctly placed near the seated elbow height, the monitor may be too low which causes neck strain. If you place the laptop up high enough for the neck (eye-level or slightly lower), then the keyboard is too high for typing causing shoulder or wrist strain. Additionally, because the monitor is only inches from the keyboard it is easy to develop eyestrain from “near” viewing. Another problem with the typical laptop is that the keyboard is so narrow that it can cause the wrists to deviate to the side - an awkward position that is a risk factor for Musculo-skeletal disorders such as tendonitis and carpal tunnel syndrome.

In contrast, a desktop computer has a separate keyboard and monitor, which can be independently placed where needed to allow good ergonomic positioning.

For these reasons a laptop computer, without any add-on peripheral devices, is not recommended for intensive users who don't need computer mobility. When a computer is used four or more hours a day, desktop configurations can be more economical as well as easier to set up in an ergonomically correct positions.

Suggestions for Mobile laptop computer use

If you are using the laptop as a mobile unit at multiple temporary locations, or if it is your primary computer without any peripheral devices such as external monitor or keyboard, there are some tricks that you can use to increase your comfort and efficiency. When working on the computer, the goal is to be able to have the arms and shoulders resting comfortably at the side, the wrists straight, and a neutral upright posture in the neck. If the machine is too high (such as on a typical dining table or desk), you may get shoulder and neck strain. If the machine is too low as when it is placed on your lap, you may develop a forward bent or rounded posture, which can strain the neck.

Tilting the back of the machine up anywhere from 1 to 3” off the desk can enable the desired upright neck/relaxed shoulder posture. This raises the monitor for better viewing and allows the



wrists to straighten and the shoulders and arms to drop down to a more relaxed position. In this position the keyboard is parallel to the forearm and the wrists are straight. (See picture.)



Make sure you don't prop the machine up too high or it might slide off your desk or force you to bend your wrists back while keying.

You will also want to prop up any reference materials or source documents that you are using with the computer. Using a document holder of any sort can reduce the need to bend and strain the neck while reading.

Laptop computer use at a primary desk

If you use a laptop at one location and don't move it much, it is suggested that you add peripheral devices such as an external keyboard/mouse and monitor. Some laptops have a large screen built in (14 or 15") that may work well for most applications. Upgrading a 14 or 15-inch laptop monitor may not do as much for the user as an upgraded (full-size) keyboard and mouse. If your laptop has a high quality monitor, you may have good results by simply raising the monitor a few inches off the desk so the screen is just below eye-level. If your monitor is small or lesser quality, you might want to upgrade to a larger external monitor.

A full-size keyboard and mouse can really do a lot to make the laptop much more comfortable, and more ergonomically correct. By adding these full-sized components you will increase the speed and comfort you have as you work your computer. The peripheral keyboard and mouse can be placed independently of the monitor, and will give you the flexibility needed to place them correctly. The keyboard can be placed on a keyboard tray or adjustable height work surface and adjusted to the seated elbow height without affecting the placement of the monitor.

An external or add-on mouse can also boost your efficiency while navigating your programs. Most users find that a mouse or track ball is much easier to use and more precise than "touchpads" or other "imbedded" devices found on laptops. Modifying the mouse settings found in the control panel of the windows operating system can also enhance mousing efficiency. Selecting "snap to default button" available in windows 98 and newer systems automatically puts the cursor on default buttons when new dialog windows open. This reduces the amount of movement required from the user. Choosing a different "scheme" for the display settings allows you to choose larger icons for your windows. This increases the target size and reduces the precision required to navigate your programs with the mouse.

To facilitate all of these peripheral devices and to enable the attachment of other devices such as a "PDA" or "Zip Drive" you may need to get a "Docking Station" or USB Hub so all of these attachments can run off your laptop. Not only will the Docking Station or Hub allow you to attach the devices but it also helps manage all of the wires and cables that come along with these



pieces. Check with the manufacturer of your laptop or with a computer retailer to see what options you have for getting everything connected.

Summary

The laptop computer is a valuable tool when portability is much needed function. It may not be the best choice when considering the ergonomics of the workstation. If used for long periods the contemporary laptop can cause discomfort for the users. It is always advisable to use add-on devices such as an external keyboard, mouse and monitor. These items are considered essential equipment for users wanting to achieve ergonomically correct positioning with their laptop computer.

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