A laptop and a hotel room is many people's modern-day office, and even students are getting into the fray with school-sponsored notebooks. But while convenient and powerful, they’re also a potential danger for people who don’t take the time to learn good usage habits. Smaller keyboards can mean sore fingers, and monitors that won’t move independently from the keyboard mean that you’re often forced to choose between an aching neck or aching wrists. Add cell phones and PDAs to the mix, and it’s a repetitive stress injury just waiting to happen. But with just a few precautions, you can help limit your risk and learn the principles of ergonomic computing. Welcome to HealthyComputing.com's™ Mobile Ergonomics Site!

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Overview

Notebook computers were originally designed as a temporary solution - a short-term replacement for the traveler's desktop computer. But as they improved, laptops became many people's primary (and sometimes only) computer. Companies have been finding ways to make them smaller and more portable ever since, and laptops are now a staple of business and educational computing. Yet not much attention has been paid to the ergonomics of mobile computing, and most products are designed with portability - not user safety - in mind. So what can you do to protect yourself? Read on to find HealthyComputing.com's™ guide to laptop computing, including an overview of ergonomic pitfalls, tips for healthy usage, and a guide to ergonomic products and accessories. In five minutes, you'll be an expert on safe and comfortable computing.

Potential Pitfalls of Notebook Computing

As wonderful as they are, notebooks have some inherent design features that make them potential ergonomic dangers. Normally, with a desktop computer, you'd position the top of your monitor around eye level, and place your keyboard at about the same level as your elbows. With laptops, however, the keyboard and the monitor are attached, so you can't adjust their positions independently - and they're very close together. The result is that you have to compromise on comfort. Placing the laptop low (in your lap or on a desk) for comfortable arm position means that you have to tilt your neck forward to view the screen; raising the screen to an acceptable level means that your hands are now reaching too high. Many laptops also feature keys that are smaller than those found on traditional keyboards - a potential cause of hand and finger pain.

Screens are typically smaller as well. The standard desktop screen is 17" while the typical laptop's is around 13", so notebook users are trying to view the same amount of information in a smaller space. (Because of differences between the LCD screens used in laptops and the CRT screens normally used on desktops, however, a viewable area of 15" on a notebook is generally comparable to that of a 17" desktop - so this isn't as bad as it first seems). Notebooks are often used in cramped spaces, leading to poor posture, and since the screen is attached to the keyboard, it's harder to adjust for glare. You can't reposition the screen slightly to eliminate glare because this also repositions the keyboard!

The laptops' use of an LCD screen is a big plus - these are considered ergonomically superior to CRTs. Unfortunately, LCDs generally look best at just one resolution. Changing this resolution distorts type and tends to make it look less legible. (This may make it more difficult for people with vision problems). And since so many laptop components are integrated, it's harder to upgrade or replace a part (you can, however, attach components externally, and these can make a huge difference). Finally, laptop bases get hot - a fact to which any shorts-wearing laptop user can attest.
So how can you avoid these potential aches and pains? First, take more frequent breaks. When using the laptop, you're usually more cramped than you would be at your desk - so taking short breaks and changing your posture is particularly important. If the notebook's on your lap, consider switching its position occasionally; leave it on your lap for 30 minutes to promote ideal wrist posture, then switch it to a table to improve your neck's position. While the notebook's on your lap, consider using a footrest to support your feet and help raise the screen height (or raise the laptop off your lap with a pillow or cushion). And pay attention to where you sit - stools and couches may not make the best chairs!

Reducing the number of peripherals you carry will greatly reduce your bag's weight and the subsequent stress-and-strain on your shoulders. Many laptop accessories are removable (like disk drives, CD-Rom drives, etc.), so leave behind items you don't need. You'll not only decrease clutter, you'll also feel a whole lot better. And while you're carrying that reduced-weight bag, consider switching shoulders from time to time - don't leave all the burden to one shoulder. You can even buy a laptop bag with wheels, and roll your bag through the terminal or around campus, taking the weight off your shoulders entirely.

Of course, the normal rules of desktop computing still apply. Try to keep your wrists in a neutral position (not bent), sit about arm's length from the screen, keep open angles with your elbows (90 degrees or greater), and use a light touch while typing. To see more tips for using your mouse, monitor, keyboard, and lighting, visit healthycomputing.com/office/setup.

Finally, consider alternatives to the laptop. If all you're doing is retrieving email while gone, try using a wireless-enabled PDA like the Blackberry or Palm Pilot. They're just as functional, and a whole lot lighter. (With text-to-voice messaging services, you can even get away with using just a cell phone).
If you can't change your laptop, can you add anything to make it better? You bet. Companies make a variety of laptop accessories to remedy the problems. From document holders and external keyboards to screens that detach entirely from the notebook to let you place them anywhere, there's no lack of solutions. Here's HealthyComputing.com's™ quick guide to laptop accessories and their uses:

**External Keyboards** allow you to more freely position your keyboard, meaning that you can independently adjust both the screen and the keys to obtain a better ergonomic position.

**Document Holders** keep documents positioned properly while you're working from them, helping you avoid pain and save space on your desk. Chances are that you lay documents or worksheets flat on your desk, repeatedly tilting or twisting your head when returning attention to the screen. Document holders raise papers off your desk, keeping them in the line of sight (and at the same height as) your screen. Some even attach directly to your laptop's screen; this means less head movement and increased comfort.

**Laptop Stands** resemble a music stand; laptops are placed on a height-adjustable platform which allows a wider variety of adjustment. In essence, it's a portable desk - meaning you're not confined to the height of whatever desks or countertops happen to be convenient. Laptop stands are great for people who have a favorite chair from which they work; it lets them bring the desk to them.

**Glare Filters** (also known as glare screens) help cut reflections and glare, both of which are common causes of eyestrain. Attached to your screen, they filter out up to 99% of reflected light, allowing you to see your screen more clearly. (If you work with sensitive documents, you may also want to consider a combination glare filter/privacy filter).

**External Mice** are often used by people who find the laptop's built-in touchpad or trackball difficult to negotiate. The bigger size of a traditional mouse lets you use your entire hand to move the mouse, distributing the motion over a wider area and leading to a more comfortable experience for many users.

**Laptop Lights** Since most mobile users don't have an adjustable task-light like the one at their office, getting proper lighting to reduce eyestrain can be difficult. Laptop lights attach to your notebook (using either battery power or your USB port) to provide a focused, adjustable task light. This accessory is commonly used for night-time work or on airplanes.

**Ergonomic Carrying Bags** are generally designed with broader shoulder straps to more evenly distribute the weight, and often have wheels to let you remove the burden from your shoulders entirely.

**Detachable Screens** A new advancement in laptop computing, these notebooks allow you to completely remove the screen and place it nearly anywhere. Similar to the concept of an external keyboard, they let you independently adjust the position of your keyboard and monitor, helping create a more ergonomic arrangement. They're also a good tool for presentations, allowing the moderator to control the progress while keeping the screen visible for their audience.

**Laptop Supports** are cushions or pillows used to adjust the height of the notebook on your lap. Companies also make desk-based models that raise the laptop off the desk, saving space and bringing the monitor height closer to an optimal viewing position.

**Docking Stations** let laptop users enjoy the comfort of full-sized peripherals at the office while preserving a notebook's portability for travel. Docking stations contain connections for standard-size peripherals such as keyboards, monitors, and mice. When at your desk, you simply plug the notebook into the docking station, which serves as an interface between the components and essentially creates a desktop computer. When you're ready to leave, you simply remove the notebook from the docking station.
Overview

People are often surprised to learn that their shoulder and neck pain might be related to their phone use. But if you're like most cell users, you probably occasionally cradle the telephone between your head and a hunched shoulder, talking and typing (or driving) simultaneously. Poor usage habits can lead to discomfort, but simple tips - like alternating ears for each call, or storing commonly-used numbers in your phone's memory - can help. Read on for our no-frills guide to the ergonomics of cell phones.

Healthy Usage Tips

Like nearly all activities, repetition can lead to stress and discomfort. Phones are no different, and repeatedly cradling the phone between your ear and a bent neck is a sure-fire prescription for shoulder pain. The best solution is to use a hands-free headset. Already required by some US states for drivers who talk on the phone, headsets free up your hands and let you keep your neck in an upright (and neutral) position.

If you can't use a headset, consider alternating ears for each conversation (or every ten minutes for long conversations). Changing sides (and hands) will distribute the stress more evenly, and give each ear a chance to rest.

Put commonly-dialed numbers into your phone's memory. Dialing becomes more difficult on the smaller keys of a phone, meaning that there's more potential for stress and strain on your fingers. With the advent of text messaging, our fingers (and especially thumbs) are getting even more of a workout. Physicians are already beginning to see injuries associated with repeated keying, and the introduction of cell-based games has only increased the potential for problems.

Finally, remember that the best solution is to limit your exposure entirely; reducing the amount of time you spend on the phone or combining phone use with alternatives like email can help prevent problems from ever starting.
PDAs like Palm Pilots and BlackBerrys are great inventions - they let us be more productive while away from our computers. Many travelers use them instead of address books, laptops, or notepads, and with good reason - they can store, organize, and retrieve information quickly. But like all computing devices, PDAs can lead to discomfort if used repetitively and haphazardly. Follow these guidelines for choosing an ergonomic PDA, then read the safety tips and suggestions section to ensure your continued comfort and health.

Ergonomic Considerations for PDAs

Nearly all of your interaction with the PDA will be through the screen, so it pays to choose the right screen type. Will you be using the PDA primarily outdoors? If so, then you may want to consider a monochrome screen instead of a colors screen - color displays tend to be less readable in direct sunlight. Do you need a good backlight for indoor or reduced-light environments? You might want to test out each PDA's backlight before buying. Different companies produce different screen technologies (transreflective, backlit, etc.) - choose the one that's easiest for you to read. And while you're at it, consider the screen resolution - some PDAs have high-resolutions screens, which make for more comfortable reading, and better viewing of pictures. If you're going to be spending a lot of time reading, a high-resolution screen may be worth the investment.

If you're going to be reading long document frequently, you may also want to consider a PDA with a jog wheel. Similar to the "web wheel" found on most mice that lets you scroll through a web page, the PDA's jog wheel allows you to scroll through a document without having to tap the "down" arrow repeatedly with your stylus. Finally, don't neglect the size and weight considerations of PDA - after all, their whole goal is to be portable!
As with computers, it's always a good idea to reduce the amount of repetitive motions you make; this can reduce your chances of injury. On a PDA, most of these repetitive motions come from entering text or information into your PDA. The area to enter text isn't that big, and many people who have to input large amounts of text are subject to hand or wrist pain. To that end, you may want to learn your PDA's shortcuts. Many offer combinations for copying and pasting text (much easier than retyping all that information on the PDA's tiny screen!) Some software programs let you configure your entire screen to accept stylus input, instead of just a small area at the bottom (bigger hand motions means less stress). The best solution, of course, is not to enter data on your PDA at all. Enter all your contacts, appointments, and information on your PC, using a comfortable keyboard and big screen, then synchronize; now you're using the PDA mainly for information retrieval. One final note - don't forget to clean your screen! A clean screen will help ease your eyes and may prevent eyestrain.

There are a variety of products that can help make your PDA more ergonomic. One of the most common is an external, portable keyboard. Attaching to the bottom of the PDA, they allow you to enter information by typing on a standard keyboard instead of writing, and are often used by those who see their PDA as a replacement for the laptop while travelling. Many people, however, like to travel light, and only bring the standard stylus. Since styluses are built thin to fit easily into the PDA casing, you often have to use a tight, pinched grip to hold them. People experiencing hand or finger pain from prolonged usage may appreciate a stylus with a wider, ergonomic grip that makes it easier to hold on to. Some pen manufacturers even make multi-function models that include a stylus tip.

The list goes on. For people who have trouble reading the tiny text on tiny displays, there are screen magnifiers to enlarge their view. You can even buy thin-film screen protectors to protect your screen against scratches (which helps improve overall readability). Choose the products that are right for you - and remember our healthy usage tips - and you'll be well on your way to ergonomic computing.