



Students spend long hours sitting while reading, studying, playing video games, laboring over assignments, working in labs, etc., oftentimes in prolonged, awkward, and static positions. Students often sit in poorly designed seats and at awkward desk arrangements. They frequently use computers for extended periods. Prolonged sitting during these activities may cause muscles and other soft tissues to become stretched or shortened compared to normal. Muscles may be overworked or become constantly contracted. Blood and lymph flow may be constricted. Soft tissues may become inflamed. Nerves may even get irritated.

The abnormal stresses placed on the student's body may cause discomfort ranging from minor and transient, to pain or soreness which subsides overnight, to debilitating pain which hinders or prevents completion of necessary tasks. Pain from the poor or prolonged postures may present as headaches, neck and low back pain, pain in the shoulders, elbows, wrists, and hands. If pain is especially severe, it may even be felt radiating down a leg to the toes or down an arm to the fingers.

Many of these aches and pains can be avoided by following simple guidelines which will decrease these increased stresses placed on a student's body. Changing one's study habits, work style, and study or computer work area frequently are often sufficient to alleviate significantly or abolish completely the pain which may arise.

Developing good habits as a student is not only beneficial now, but it can certainly help prevent future problems. Many students will go on to careers involving hours sitting at a desk and then going home relaxing in a soft easy chair watching TV or using a computer.

Following are specific ergonomic guidelines to improve one's posture, followed by guidelines and suggestions to improve study habits.

IMPROVING POOR POSTURE

Poor posture happens easily if one is intensely concentrating on the work at hand. It is very difficult to consciously maintain proper posture. But, if the study space is arranged properly initially, one won't have to think about constantly checking his or her posture.

A very common posture frequently seen around campus is a slouched position due to sitting in a chair with poor low back support. Instead of the low back maintaining its natural arch, the low back instead rounds out. The upper body and head drop forward, causing the upper neck to extend in order for the head to remain looking up. Instead of the spine bearing most of the weight, muscles, vertebral discs, and ligaments bear much of the upper body weight. Over time this slouched position may cause pain.

To avoid pain from occurring, the following ergonomic tips are offered. Some of these tips will be more difficult if one has a laptop computer.

The desk should:

- have sufficient knee room so that one can scoot close to the front of the desk;
- have sufficient desk top area to place the computer in a position whereby the monitor is approximately an arm's length away;
- be at a height such that one is able to maintain the wrists in a neutral position when using a computer while the shoulders remain relaxed.

The chair should:

- be adjustable, comfortably padded with no sharp edges on the seat;
- maintain the spine in a vertical or slightly reclined position. If the chair does not provide adequate low back support, then a lumbar cushion, rolled up towel, or folded sweatshirt should be used. And, once good support is available, remember to use it. Do not have the tendency to sit on the front of the seat and not use the back support;
- allow for the hips and knees to be on roughly the same level and for the feet to be placed flat on the floor. A foot rest may be needed if this is not possible;
- preferably have arm rests that comfortably support the elbows and forearms and allow one's shoulders to relax. The arm rests should not prevent one from scooting forward to the front of the desk.

The monitor should:

- be positioned directly in front so that the body and head are not rotated;
- be positioned such that the top is at or just below eye level.

Keyboard/Mouse

- The keyboard should be positioned with the letter “b” in the middle of one’s stomach to prevent wrists from deviating to one side too much;
- The keyboard should be elevated to a height so that the wrists are in a neutral position. Using a palm rest for the keyboard and mouse will help prevent extension of the wrist.
- The keyboard and mouse should be used with the elbows maintaining roughly a 90 degree angle and being kept close to the body. Frequently the keyboard and mouse are placed too far forward on the desk which then overworks the shoulder and shoulder blade muscles.

Lighting

- Avoid having the computer backed up against a bright light or window since this may make the screen look washed out and difficult to see, causing one to lean forward;
- Avoid any glares visible on the screen from bright lights behind or above the monitor. A filter may be useful to reduce glare.

Document Holder

- A document holder just to the side of the monitor will help prevent excessive rotation of the neck and body. Keep the holder at the same level as the monitor.

Other Tips

- Keep the computer or books in front of you, not off to the side.
- Keep the shoulders relaxed while studying. Periodically perform shoulder shrugs, rolls, and squeezes to reduce the tension in the shoulder blade and neck muscles.
- Do not sit with legs or knees crossed for extended periods of time.
- Do not allow wrists to rest on the sharp edge of the desk when typing or resting.

IMPROVING POOR STUDY HABITS

Just having a beautifully designed study or computer setup may not be enough. Other techniques can be helpful in preventing or alleviating the onset of pain. Some of these include:

- Study in well lit areas to avoid eye strain and to avoid bending in order to see the reading material or computer.
- Take periodic “eye breaks” to relieve eye strain. Focus your eyes on objects in the distance.
- Take occasional study breaks, e.g. a standing/walking break for a few minutes every 30-60 minutes. This increase in muscle activity will stimulate improved blood flow to those areas which have been kept in a shortened or lengthened position while studying.
- Alternate computer or study time with unrelated activities to allow different muscle groups to be used.
- Change study or work areas periodically if possible.
- Perform periodic stretching exercises of the back, neck, shoulders, arms, wrists, and fingers. (see examples below).
- Build in some time during most days of the week to get physical activity/exercise to keep muscles healthy and better able to withstand stress.

A WORD ABOUT LAPTOP COMPUTERS

Laptops are very popular with college students because of their great portability between dorm room or apartment and classroom. However, the portability benefit of the laptop does not come without cost. For example, since it is so portable, the student may use it in positions or locations that result in poor posture, such as on one’s lap, or in cramped spots on small tables or desks.

Additionally, from an ergonomic standpoint laptop computers are poorly designed since the keyboard and the monitor are attached. If the monitor is raised to the proper height, then the keyboard is too high and increased stress will be placed on the shoulders.

If the keyboard is placed at the proper level so that the wrists are kept in a neutral position, then stress is placed on the neck and back muscles as the head and body are forced to lean forward too much. Besides this, laptop keyboards tend to be smaller, resulting in less space between keys and in smaller size of less frequently used keys.

This tends to cause increased stress to the wrist and promotes more slouching of the upper body. Finally, one must consider the weight of a notebook and its associated peripherals if it has to be carried a distance. This weight, if carried far enough or for a long enough time, can cause new pain or can exacerbate existing pain in the neck/upper back and shoulders.

FOLLOWING ARE TIPS TO COMBAT THE ABOVE CONCERNS

- To help alleviate the inherent design concerns, accessory peripherals may be helpful. One study showed that raising the laptop so that the top of the monitor is at eye level while using an external mouse or external keyboard resulted in decreased stress to the neck and shoulder muscles compared to using a laptop computer without added peripherals. As a side note, one needs to be able to use a new peripheral for awhile to determine if it really is suitable. Ask stores what their merchandise return policies are in case the keyboard, mouse, bag, etc., does not feel right.
- When carrying the laptop, lighten the load by getting rid of any unnecessary weight in the carrying bag.
- Use a carrying bag with wide and padded shoulder straps.
- Alternate shoulders on which the bag is carried.
- Maintain an erect posture when carrying the bag.

Stretching Exercises

Below are some simple stretching and range of motion exercises useful during prolonged static seated positions:



Wrist extension stretch



Wrist flexion stretch



Upper trapezius stretch



Levator scapula stretch



Corner Stretch



Standing Extension



Chin tucks

The wrist, neck, and corner stretches can be done for 15 seconds, progressing to 30 seconds as tolerated, 1-3 repetitions. The standing extension and chin tucks can be performed 5-10 repetitions periodically.

If back and/or neck pain continues to be a problem, then it is recommended to see a McKinley provider for treatment or possible referral to the McKinley physical therapist or another health care provider.

References

Cornell University Ergonomics Web site at: <http://ergo.human.cornell.edu/ergoguide.html>

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"Laptop Ergonomics," *Macworld*; Jan 2006, Vol. 23 Issue 1, pp 85-86

"Effects of notebook computer configuration and task on user biomechanics, productivity, and comfort," *International Journal of Industrial Ergonomics* 30 (2002) pp 7-31

If you are a registered University of Illinois student and you have questions or concerns, or need to make an appointment, please call: **Dial-A-Nurse at 333-2700.**

If you are concerned about any difference in your treatment plan and the information in this handout, you are advised to contact your health care provider.

Visit the McKinley Health Center Web site at: <http://www.mckinley.uiuc.edu>