

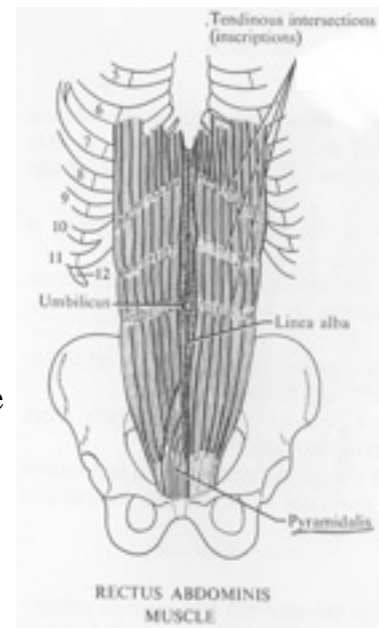
# POSTURE AND POWER

## *Dynamic Use of Your Body at Your Computer*

*by Ann Grassel*

Ergonomics is the study of the body as it works. Work implies movement that accomplishes a set task. Yet, our work at the computer often is done with very little movement of the body as we attempt to accomplish many tasks. Therein lies the problem.

Some parts of our body moves, and some parts are still. Where movement meets stillness is the place where most of the repetitive stress injuries occur. This can be in the low back, in the neck or in the wrist. In my 23 years as a physical therapist, this has been one of the biggest problems I have encountered. How does posture support movement and work?

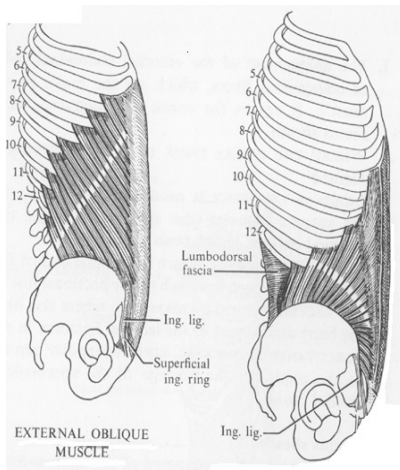


The definition of insanity is doing the same thing over and over again, expecting different results. Seen from this light, most of the ways we are injured while working on the computer is insanity. The injured worker is usually not the problem, the problem is the misinformation that is given to that worker regarding computer use and workstation set-up.

At a recent ergonomics conference, I was talking with one of the sales reps for a very high end, space age looking chair, which allows a person to recline while working. (I personally only recommend the reclining position for astronauts). He said that people are basically lazy and that the ergonomics industry has to design chairs to support lazy people while they work. I told him if that is what he believed about people, that is what he would see in people.

My experience is that people want to be strong, healthy and powerful in their bodies. They want buff abs and strong backs. They especially don't want to be injured.

When we look at the Worker's Compensation statistics and see the increase in the number of computer related injuries, we only see part of the picture. What we don't see are people whose lives are devastated by injury. These injured people can't button their own shirts, can't lift a cup of coffee or open a can, can't pick up their own children and hold them in their laps. They have become disempowered in their lives. My work involves how to empower a person in their body and how that power will manifest in other aspects of their lives.



### How Can We Change Someone's Posture?

The major problems that I have identified with increased computer use are working in a poorly designed workstation and the way the work is being done. The solution has been to replace the equipment, count the number of keystrokes or miles traveled on the mouse, tell people to take breaks (while expecting the same amount of productivity) and then expect results. But often the person who is working on the computer is left out of the equation.

The new equipment or change of set-up is essential, but if we don't teach people effective ways of moving differently, and how to apply what they learn into other aspects of their lives, we are less likely to have the outcome we want. Professionals in the ergonomics field need to understand what dynamic support looks like in the body, how a person develops tone, strength and endurance, how this can be accomplished while working on a computer, and what is the best workstation set-up to support these changes.

So the question becomes: What is the most effective way to change a person's posture?

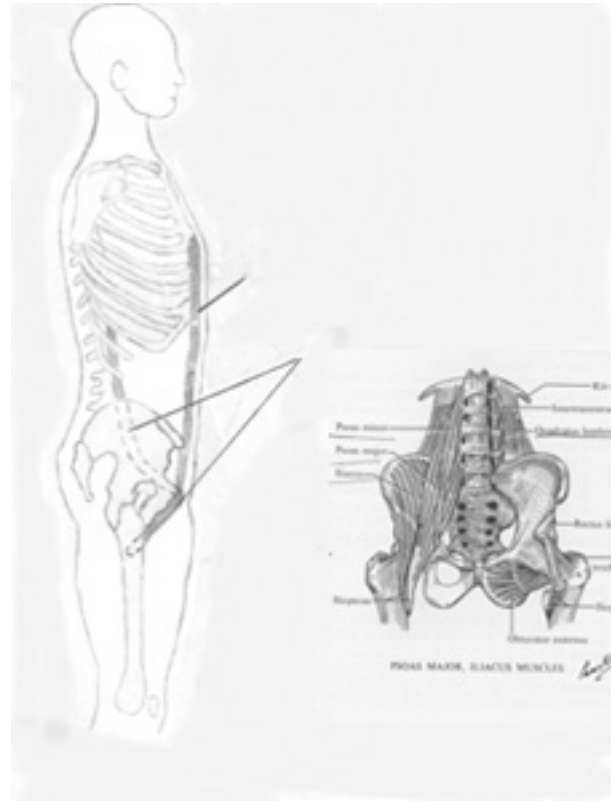
Most of the people I work with have the same complaint: "I have terrible posture." They try to sit up straight, but end up sitting in a slumped position. When a person tries "sitting up straight", they have to lift their bodies up against gravity and need to put a lot of effort into staying up straight. The body very soon either forgets to stay up straight or gets tired, and then relaxes into gravity, which drops it back into its "slump". Telling people to sit up straight doesn't work. It didn't work for us as kids and it won't work now. So people feel like failures, thinking they should be able to sit up straight and they can't. This is the insanity that was mentioned earlier. The real problem is lack of support

from their pelvis and trunk, not that they can't do it or that they are lazy.

When my son was younger, he would be sitting slumped. Instead of telling him to sit up straight, I would tell him to move his butt all the way back in his seat. When he did that, he sat up straight--without having to put effort into his body. He had moved his pelvis under his trunk, and the result was alignment. When the body is aligned it can maintain an upright posture without effort. It is from this aligned posture that movement occurs.

To begin to understand how posture works, a person first needs to understand the structure of the pelvis and trunk. If a person has a picture in their mind of what they are trying to accomplish, and then experiences what it feels like to use their muscles effectively (creating muscle memory), they are much more likely to be successful in learning a new movement pattern.

The primary muscles of support in the trunk are the abdominal muscles (abs) and the iliopsoas. Most people have heard of the abs, but very few know about the iliopsoas. When they find out that the iliopsoas causes most of the problems in our low backs and, therefore, affects the entire support system of the upper trunk, head, neck and upper extremities, their interest increases.



The abdominal muscles are huge (Figure 1). They extend from the pubic bone up to the level of your breasts and out to the sides of the body, with some fibers attached to the fascia (connective tissue) of the low back. The main muscle in the front is the rectus abdominus. It is the muscle, that when well developed, is known as the "six-pack". The abdominal muscles on either side are known as the obliques. There are two--the internal and external oblique. They criss-cross each other, one being deeper than the other, forming an "X". I describe them as "lateral struts" on the sides of the body to support lateral movement and rotation, such as working on the mouse. (Figure 2).

The iliopsoas actually consists of 2 muscles. the psoas (pronounced so-az) and the iliacus (Figure 3). The psoas is attached to the front and side of the last thoracic and all of the lumbar vertebrae. It then travels through the pelvis and joins the iliacus muscle, which arises from the inside of the pelvic bone (ilium), drops out of the abdominal cavity and attaches to the inside of the femur. (The area where the iliopsoas attaches is

often felt as a groin pull or groin pain when injured).

Because of where the psoas attaches on the vertebrae, when the psoas is too tight, it compresses those vertebrae in your low back. As it compresses, it causes the spaces between the vertebrae to decrease and adds pressure on the nerves as they exit the vertebrae. This causes low back pain and tightness. The shortness in the psoas is often seen as increased lumbar lordosis (swayback).

Chair manufactures often build chairs with a "butt-cup" or the back of the seat sloped down, which increases or matches the shortness in the psoas and then adds a big lumbar support to support the sway back. It seems that many chair manufacturers look at people's dysfunctional patterns and then build chairs to support that dysfunctional pattern. It may make people feel "comfy", but it does nothing to change the pattern that causes pain or allow movement in the pelvis.

As a result of the psoas being in shortness and pelvis usually being fixed against the back of the chair, no movement can happen at this segment, so the next level up the trunk has to compensate. (Figure 4). People often "hinge" forward from the middle of their thoracic area to reach for the keyboard and mouse, especially if the upper part of the seat back curves backwards. This causes compression in the chest, making it difficult to breathe into this area, rounding of the shoulders and a head forward posture. It also takes away the support system for the arms and hands making it necessary to use tension in the upper extremities to hold them in a position for keyboard and mouse use.

This posture predisposes the wrists to drop, which is why wrist supports and the keyboard positioned in a positive tilt developed. Again, the environment matches and supports the dysfunctional pattern.

### **What About All Those Rests?**

I always found it ironic that we encourage the use of foot rests, back rests, arm rests, and wrist rests and then tell people to work. By definition a body cannot work and rest at the same time. Another form of insanity. What needs to happen to allow the psoas to be used in length instead of shortness is that we have to use the abdominal muscles as the primary support system of our trunk while sitting at the computer.

When the abdominal muscles are engaged, (especially the lower abdominals) they hold the pelvis in neutral, decreasing the "swayback" posture and allow the trunk to work in alignment. With this new alignment, we now have length in the mid-thoracic area, allowing for deeper breathing, the head and neck in more alignment, and the upper ribs in a position to support the arms and hands as they work.

The workstation and chair set-up now has to be modified to support and encourage

this more forward alignment The chair seat is positioned with the hips slightly higher than the knees (Figure 5), with a slight forward tilt of the seat pan. The feet need to be flat on the floor, because forward alignment of the trunk uses the feet and legs as part of the support system, not only for the trunk but also for the upper extremities as they work in front of the body.

The support for the back should be lower, at the sacrum. This position supports the trunk in forward alignment, but allows the pelvis to be mobile. When the back support is behind the lumbar area, it tends to move the upper trunk into posterior alignment and decreases pelvic movement. Posterior alignment of the trunk also decreases the need for the legs and feet for support, which is why people sit with their legs tucked under their chairs. This contributes to low back pain by keeping the hamstring muscles in the back of the legs in shortness, and tilting the pelvis to decrease the length of the psoas.



### Using New Movement Patterns

The keyboard and mouse is lowered to approximately 2 inches above the knee and lower thigh and with a negative tilt. This can be accomplished with an articulating keyboard platform or with a lap-held keyboard platform (such as the PowerBoard™). The monitor is positioned with the top of the screen at approximately the same height as the middle of the forehead and a slight upward tilt of the screen.

As people start to use their abdominal muscles as their primary support system, the abs will get stronger and the person will feel less back pain and therefore, be less fatigued. This is a gradual process. It takes a while for the tone and endurance to build, so I suggest that people work "on-task and off-task".

In the beginning, they may only be able to maintain this forward alignment for a few minutes while keyboarding. I call this being "on-task". They should then rest back while reading the screen or talking on the phone (being "off-task"). Then resume being "on task" when keyboarding or using the mouse gradually increasing their time in this position. While "on-task", I also suggest that they move from their pelvis (rocking like a "bozo clown" punching bag with sand in the bottom). This movement increases circulation in the pelvis and legs, and supports movement in the upper body, especially with mousing.

With these new movement patterns, you can increase strength, tone and endurance, and decrease the risk of injury. Trying to make these same changes, while moving the old way, is just insanity.

