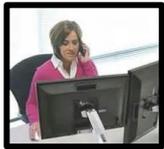


### The Trouble With Tablets

Source: Keenan & Associates

As the methods of communication have evolved, humans have always struggled to stay upright. From the beginning, putting a pen to paper on a typical desktop involved hunching forward and dropping the head to view the writing area.



The desktop PC with its adjustable monitor was a huge advancement towards better posture, as it allowed the user to sit upright in the chair with their back supported, looking straight ahead at the monitor screen. Whether the user had one or two monitors, the 'adjustable height' monitor created a more ergonomic workstation.

The laptop followed the desktop PC and started the 'Ergo De-evolution'. Once again, our posture began to fall forward and discomfort reared its ugly head. If you placed the laptop on a table, the keyboard is at the correct height but the monitor is too low. If the monitor portion is raised to the correct height to accommodate vision and keep you upright, the keyboard is now awkward.



Enter the tablet/eReader. Pew Research shows that this device has already been adopted by 50% of the population and it was only released in 2010. The tablet is used for a variety of activities but in **different locations** and with **different postures** than traditional PCs, which quickly gives rise to neck and wrist discomfort, as well as muscle fatigue.

### WHERE AND WHEN ARE WE USING THE TABLET?

Research shows we are not sitting at a computer desk using our tablet but rather it is being used on the couch, in bed, in the kitchen, in the car, at a restaurant/coffee house or gym. The tablet is not used primarily for office productivity but mostly for email checking, playing games (Candy Crush), social networking, looking up information, listening to music, shopping, checking weather, reading news and watching TV/videos/YouTube (Dr. Dan Odell, CPE).

Tablets are most often used while *doing other things*. It's common practice to check emails, look at social networking or play games while watching TV or eating. Having music on while cooking, exercising, getting dressed or waiting somewhere is not unheard of, or researching what to make for dinner or looking up the salt content of items when out to eat.

It is very difficult to use a tablet for productivity purposes. Typing on a tablet is a major pain and pain limits the amount of intense work on a tablet.

## ISSUES WITH TABLET COMFORT

**Holding** a tablet creates awkward postures and muscles fatigue quickly. The most common hand position when not using a case is to hold the device with one hand while the other hand interacts with the tablet. It is usually the non-dominant hand doing the holding (stabilizing) and the dominant hand working. The device is typically propped on the legs, lap or table.



**Reading** on a tablet usually involves holding the device with two hands on either side while the thumbs reach to interact with the screen. This creates a lot of fatigue in the hands and arms because of the long, static position being held.



**Hands-Free** use of a tablet happens when there are no interactions with the device. The tablet rests on a person's lap, a table, a pillow while the person watches a video or listens to music.

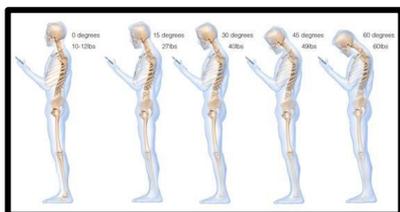
**Typing** on a tablet is most commonly seen with the device resting on the table, the lap or a stand. The device is usually propped up and the 'hunt and peck' method of typing is used. This is seen with light productivity tasks like answering an email, calendaring, viewing documents, sending a text, etc. Most people cannot tolerate extensive typing on tablets because the interface impacts comfort and duration.

## COMFORT TRADEOFFS

Holding a tablet up higher is more comfortable for the neck but it places the load on the arms, which fatigue easily. Setting the tablet down lower is comfortable for the arms but puts the neck in an awkward position as posture follows vision. "Comfort" is what affects the time a posture is held.

In a new study released in November, 2014 by *Surgical Technology International*, it suggests that looking down at a cell phone (or tablet) is the equivalent of placing a 60-pound weight on the neck. This would be like hanging four bowling balls from the neck and looking down at the device! The author of the article stated, "As the head tilts forward, the forces seen by the neck surge to 27 pounds at 15 degrees, 40 pounds at 30 degrees, 49 pounds at 45 degrees and 60 pounds at 60 degrees.

## Head, Neck and Shoulders



*Surgical Technology International*

In a nutshell, the **location and angle** of the tablet determine the amount of head, neck and shoulder pain. When placing the tablet flat on a table or on your lap, it requires neck flexion (bending head down) well beyond the recommended limits. In addition, when the tablet is flat, there is more eye fatigue because the eyes have to work harder to hold their position.

## RECOMMENDATIONS:

- ✓ Raise the tablet up to reduce neck flexion. Stand the tablet on a table and use the case to elevate the tablet and angle it up slightly.
- ✓ Minimize using the tablet on your lap. Getting the tablet off the lap is most important when looking for ways to eliminate poor neck posture. Use a pillow to elevate it on your lap.

## Wrists

Most wrist issues come from holding/supporting the tablet. For one-handed support, hand and forearm discomfort is common. Radial deviation, bending the wrist towards the thumb when holding the tablet, is also a concern.

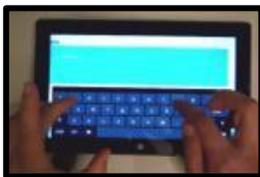


Wrists take another hit when **typing** on a tablet. The tablet screen is smaller and the keypad letters are not raised so finding and centering yourself to the home row is difficult. The ergonomic issue here is with wrist extension, or bending at the wrists and bringing the hands up. The wrists will angle up to match the angle of the screen. If the tablet is angled up, it is more comfortable on the neck but more dangerous for the wrists.

Forearm fatigue is another issue. The forearm muscles tire quickly when they are required to hold the hands up for long periods when typing in this manner. Note that forearm fatigue and wrist deviation are greatest when performing this task with the tablet on the lap.

## RECOMMENDATIONS:

- ✓ Get the load of the tablet off the arms. This might mean trying an external device that supports the device.
- ✓ Use an external keyboard and mouse to reduce wrist extension while typing. Research shows that typing speed is fastest when using a traditional external keyboard. (Odell, 2014)



- With a physical keyboard, the user gets tactile feedback and there are landmarks (raised nubs on the J and F keys) to help orient the user to the home row. Without the physical landmarks and tactile feedback, the typing style changes. On a tablet, there is no way to orient to a home row and fingers slide (swiping) causing productivity to fall.
- Smaller keys and 'mini' layout keyboards make it more difficult to find the home row, which also slows productivity.

**SUMMARY:**

Tablets are unlike traditional PCs because they are used in different locations, with different postures, while doing other things. Because of this, the ergonomics with a tablet become far more challenging. The good news is that when using the tablet becomes uncomfortable, it is easier to change postures! It's not that easy to move your office PC set up around several times a day to give your body a break.

**The biggest recommendation is to get your tablet screen UP.** This can be done by using a case or a tablet stand. Avoid using the tablet on your lap, as posture follows vision. If you must use it on your lap, try placing it on a pillow to raise its height and reduce dangerous neck flexion. Whenever possible, set the tablet on a table rather than holding it with your hands as hands and forearms fatigue quickly. Consider finding an external keyboard that can be separated from the tablet screen. This way, you can set the tablet on a higher surface to elevate the screen and have a lower keyboard to eliminate some of the wrist extension when keying.