

Ergonomics at Work in Front of the Computer

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Many people who work in front of computer screens experience pain with various body movements, a condition known as RSI Syndrome (Repetitive Strain Injury). Also referred to as „mouse arm,“ the affliction can be diminished or eliminated altogether by changing the equipment and ergonomic configuration of the workstation. For example, this document addresses the proper use of a pen tablet. The pen is used as an input device, not only for painting and drawing but for all general purposes, including precise navigation.

1 Basic Ergonomic Posture

You can achieve the right basic ergonomic posture for your arms by lightly resting your forearms on an empty desk space. Gripping the pen will now hardly alter your basic posture. If you grasp the mouse, however, you will have to twist your joints. Navigating with a pen instead of a mouse therefore offers an ergonomic advantage.



2 Optimum Tablet Position

Remove all objects between you and the monitor and then lay your forearm in a relaxed position on the desk. Now, hold the pen in the same hand you use for writing so that the tip glides closely across the surface of the tablet. To achieve the optimum position, the tip of the pen should be placed directly above the center of the tablet. Larger tablets (A4, A3) should be placed nearer to the screen so that the angle of the elbow joint is never less than 90°. Your wrist should not be bent downwards and the lower part of your forearm should be able to rest on the desk.

3 Trade-off Position when Using a Standard Keyboard

If you are right-handed and use an extended keyboard with a numeric keypad, you will have to find a compromise between the best ergonomic position for your keyboard and the tablet. Together with the keyboard, push the tablet to the right until you find a position where your wrists are bent as little as possible when operating the pen and keyboard.

For left-handers, the tablet should be placed directly next to the keyboard.

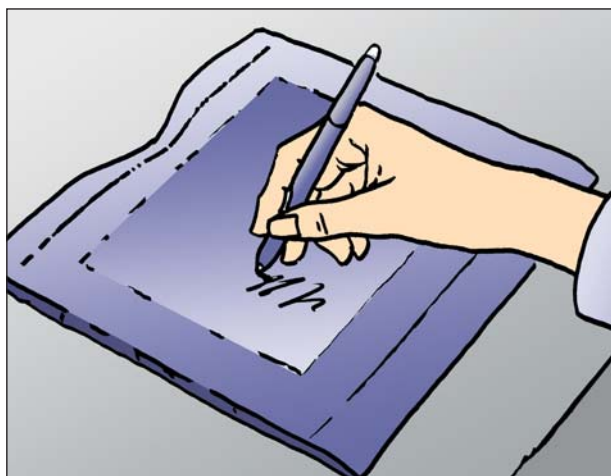


④ Operation

Gently gripping the pen, hold it flexibly in the same way that you hold a pen or pencil when writing on paper. The side of the hand should touch the tablet without applying any pressure. Left-handers should check the position of their hand: there is nothing to read on the tablet, so that no text is obscured by the hand used for writing. Natural left-handers who write with their right-hand should actually hold the pen in their left hand because the tablet is better placed to the left of extended keyboards than to the right.

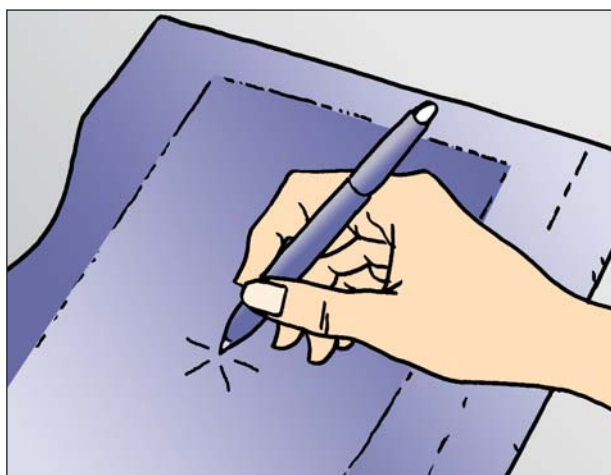
⑤ How to Hold the Pen

The pen should rest correctly in the hand. Pens that are too small may cause cramp, which will require the pen to be made thicker. Pens produced by established manufacturers are generally designed to suit a wide range of hand sizes and seldom need alteration. Thanks to the ergonomic design, you only need to apply light pressure when holding the pen. Keep the pen at an angle as with standard pencils or ballpoints, and hold it so that it is „too long“ rather than „too short“. This will avoid cramping.



⑥ Tap - Don't Press

Do not press the pen down hard on the tablet. A slight tap of the screen is sufficient to simulate a click. If this is not the case, change the sensitivity of the pen for a more slanted position (if available).

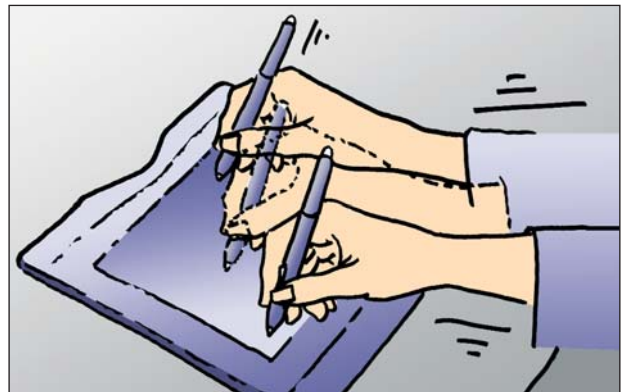


⑦ Double-Click

You should be able to double-click using the pen button (side switch). This reduces the need to repeatedly jerk your wrist. Some pens are equipped with two programmable side switches. If you use your thumb to activate the pen button, program the top switch to double-click. However, if you prefer to use your index finger, program the lower switch to double-click.

8 Pen Travel

For rough navigation, use the entire arm to move the pen (as you would with a mouse). Only move the wrist for clicking/tapping. For more exact navigation, control the pen with your fingers. In contrast to navigating with the mouse, the entire movement is spread equally across both arm and finger, i.e. the strain caused by repetitive movements is reduced across all limbs. This leaves more time for your muscles to be supplied with oxygen, reducing the risk of muscle cramp and damage to muscle fibers.



9 Rest

Whenever possible, you should briefly rest the heels of your hands on a surface (tablet, table edge). If you are using a keyboard, you should place the pen in its holder or on the desk. Do not keep it in your hand. You should also take the opportunity to exercise your arm.



10 Keeping Your Place

In contrast to the mouse, the pen allows you to work on a one-to-one ratio between the active tablet area and the monitor. This creates more precise hand-to-eye control, i.e. improves the fine coordination between eye and movement. With increased practice, you won't need to spend time looking for the cursor on the screen and there is no need to keep scrolling back as you would with a mouse. This means it is sensible to provide a set place for your tablet. After a time, your hands will „learn“ where to find the cursor.



11 Jumping Mouse

The pen glides across the surface so you can effortlessly jump from one point to another, e.g. to the menu bar and back. Do not slide the pen like a mouse. Instead use it like a pointer on a chalkboard. This not only rests your arm, it increases productivity.

12 Don't Look

Right from the start of your pen exercises, you should never look at the tablet - you will only be able to ascertain the increasing precision of your pen movements by looking at the screen. Hand-to-eye coordination is a complex task for the brain. And constantly changing the direction of your eyes will make this more difficult.



13 Pen or Mouse

Every repetitive movement that strains just one part of the body hides potential risks for musculoskeletal disorders. Compared to a mouse, the pen offers several advantages that result from better basic posture, more diverse patterns of movement and stable hand-to-eye coordination. However, you should take temporary breaks, especially if your fingers cramp, and switch back to using a mouse or other input device following periods of intensive pen use. If you cramp, you should check how you hold the pen and take a quick pause for thought to release inner tension.

● About the author

Prof. Dr. Hardo Sorgatz is a professor at the Institute for Psychology at the Darmstadt University of Technology. He is president of the German Society for Psychological Pain Therapy, Vice President of the German Society for the Study of Pain (DGSS) and founding executive board member of ergo-online.de - Society for Work and Ergonomics Online. His research focuses on RSI and display screen work. For further information see www.ergo-online.de and www.rsi-online.de