Knee-Tap©

The Knee-Tap© Methodology establishes a high level approximation of the ergonomically correct heights for the chair seat, keyboard and monitor for use with an adjustable workstation. Knee-Tap© is quick, logical, and easily taught.

The primary ergonomic component of a computer workstation is the chair. The Knee-Tap© Method utilizes the bony protuberance at the top of the tibia (tibial tuberosity), just below the hollow under the kneecap, as an anthropometric indicator. Prior to the Knee-Tap© Method, setting the correct height of the seat pan was trial and error or a cumbersome process of measuring the popliteal height[1] while seated and then raising or lowering the chair seat pan accordingly.

Adjusting the Workstation to Fit You: In three steps

1. Chair seat pan height: The Knee-Tap© Method quickly establishes the appropriate seat pan height for any individual; simply approach the chair and tap your knee into the front waterfall edge of the seat pan and adjust the seat pan height so that the waterfall edge is at the same height as your tibial tuberosity[2] (the waterfall edge of the chair should be in or under the hollow beneath your kneecap). It will be readily apparent whether you need to raise or lower the seat pan. When you turn around and plant your posterior firmly into the back of the chair your feet will be flat on the floor and your torso, thigh, lower legs and feet will form approximate 90-degree angles. The front edge of the chair should not put pressure on the under side of your thighs and the front edge of the chair should not contact the back of your lower legs (adjustable seat pan depth is an ergonomic feature on some chairs). Adjust the height of the lumbar support so that it fits into the small of your back and adjust the back tilt. Raise or lower the chair arms so that your forearms do not quite make contact when your shoulders and arms are relaxed in the keyboarding position

2. Work surface height: With arms hanging loosely from relaxed shoulders, raise your forearms until they are parallel with the floor; the workstation surface or keyboard support surface, should be 2"-3" below the elbow (1"-2" for children) this measurement depends on finger length and keyboard thickness. Wrists in flexion or extension (bent) stress the carpal tunnel area in the wrist. Vertical upper arms and horizontal (level) forearm/wrist/hand and fingers lightly curved and touching the home keys is an ergonomically neutral, free floating position where the shoulder is the hinge point, this produces the least amount of stress and is the easiest arm posture to maintain. The center of the keyboard (excluding the 10-key pad) should be aligned with your belly button (and it might touch the belly for larger individuals); with vertical upper arms, place the keyboard so that the home keys are under your finger tips (fingers are slightly bent) keeping in mind a relaxed vertical arm. If the home keys are too far away from your body a lever arm is created, straining the upper arm, shoulders and neck and it shifts more arm weight to your fingers and/or hands and wrists. If a wrist rest is used with a lever arm the carpal tunnel area will be further compressed. Using a wrist rest while typing anchors the wrist/hand/fingers and tensions the skin and muscles when stretching to reach keys. In many cases placing a wrist rest between the body and the keyboard will create a lever arm.

3. Monitor height: Raise or lower the monitor until the top edge of the monitor screen is positioned at eye level or slightly lower. The monitor should be at least an arm's length away, placing the monitor further away can reduce eyestrain, increasing font size may also help reduce eyestrain. Thin, flat

screen monitors can be placed further away, towards the rear of the workstation, take up less room on the desktop and, are easier to move and tilt for glare control. The ability to focus on closer objects (focal convergence) decreases with age but contacts and eyeglasses can be ordered for computer use. The ability to move the monitor closer may benefit those with low vision. Bifocal users may want to lower the monitor but this can cause you to tilt your head down, creating a forward head and neck tension because your head is not balanced over your spine. The weight of your head, levered by a forward head and the resulting excess loading, has to be supported by your neck muscles. The monitor refresh rate should be set at 70hz or higher.

Disclaimer: The ergonomic guidelines presented are for information purposes only and do not constitute a prescription. Ergonomic products are only one part of the workstation environment. Combining products and behaviors may be counterproductive and use of any ergonomic product is at your own risk.

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[1] The popliteal height measurement is taken when seated; with feet flat on the floor; measure the height from the floor to the skin/tendon connection, under the thigh, behind the knee.
[2] The kneecap, Patella, is above the Tibial Tuberosity (bump), which is at the top-front of the lower leg bone known as the Tibia. The hollow area between the Patella and the Tibial Tuberosity is known as the Infra-Patellar region.

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A Practical Methododology for Establishing Ergonomic Parameters at Computer Workstations

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