ERGONOMIC KEYBOARD STUDY RESULTS

Regarding Adjustable Split Keyboards:

"…the adjustable keyboard was more comfortable…in comparison with the conventional keyboard."[1]

"…split keyboards place the wrist closer to a neutral posture in the radial/ulnar plane substantially reduc[ing] one occupational risk factor… ulnar deviation of the wrist."[2]

"There is increasing evidence that alternative geometry keyboards may prevent or reduce arm pain or disorders, and presumably the mechanism is by reducing awkward arm postures."[3]

"Alternate keyboard designs can significantly affect tendon travel and may address reduced repetitiveness in typing by reducing the amount of tendon travel."[4]

"…[the tested] split keyboard [configurations] are beneficial in promoting a neutral wrist position, which theoretically would decrease exposure to WMSDs such as tenosynovitis in the wrist and carpal tunnel syndrome."[5]

"…[study results] identified a reduction of symptoms, an improvement in functional status, preference for and increased satisfaction with the [alternative] keyboards, and maintenance of typing speed and accuracy for both groups."[6]

"…[split] keyboards with a slant [open] angle of 10 degrees to 12.5 degrees…are effective in placing the wrist in near neutral ulnar/radial deviation when typing…[and] tilting the keyboard halves 20 to 30 degrees is effective in reducing forearm pronation to approximately 45 degrees."[7]

"Analyses of…six studies indicated that the [Adjustable Open-tented keyboard] had a large effect on pronation and ulnar deviation…"[8]

Regarding a Keypad-less Keyboard:

"Working posture of right-handed mouse users is improved by removal of the numeric keypad."[9]

"Compared to the [standard keyboard with keypad] mouse position, the [keypad-less keyboard] mouse position reduced wrist extension slightly and promoted a more neutral shoulder posture."[10]

"…it would probably be preferable to use a keyboard without the numeric keypad if the mouse is to be used on the right-hand side."[11]

Regarding a Soft Keytouch:

It has been estimated that professional typists can exert more than 46 tons of force each week while typing, and that keyboardists typically exert 3-5 times the necessary force when striking a key.[12] Here are several studies showing the benefits of a softer key touch.

"The average of the peak forces for all keystrokes was lowest for the keyboard with the lowest required activation force."[13]

"…in order to minimize the biomechanical loads to forearm tendons and muscles of keyboard users, keyswitches with a make force of 0.47 N or less should be considered over…a make force of 1.02 N."[14]

"[All keyboardists] produced [key] forces well above that required to operate the keyboard (4-5 times activation force)...suggest[ing]that generation of excessive force… may contribute to the severity of upper extremity symptoms."[15]

"…key activation force > 48 g…was associated with a greater risk of hand or arm symptoms or hand and arm disorders."[16]

"…increased time pressure increased muscle activation, key strike force and wrist deviations [while] increased mental workload increased key strike force."[17]

<u>Other Relevant Research Results of Interest</u>

"…daily or weekly hours of computer use is more consistently associated with hand/arm MSDs than neck/shoulder MSDs."[18]

"Minimizing ulnar deviation…appears to result in reduced risk of hand/arm outcomes."[19]

"In most computer workers with neck/shoulder symptoms or hand/arm symptoms, productivity loss derives from a decreased performance at work and not from sickness absence."[20]

"…a subclinical pathological state [may] exist in the keyboard user group [possibly] caused by prolonged sitting and keyboard use…. This research highlights the need for intervention in an office environment to prevent further cases of [RSI] from developing."[21]

"…improved [Return-to-Work] outcomes [from WMSDs are attributed] to early therapy using active rather than passive techniques and an emphasis on patient education and home exercise programs."[22]

"This analysis points to substantial under-reporting of MSD in Connecticut: estimates of unreported [MSD] cases exceed those officially reported by a factor of 11:1."[23]

"…typing with upper extremity support in conjunction with a wrist rest may be preferable to the "floating" posture implicit in current guidelines."[24]

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