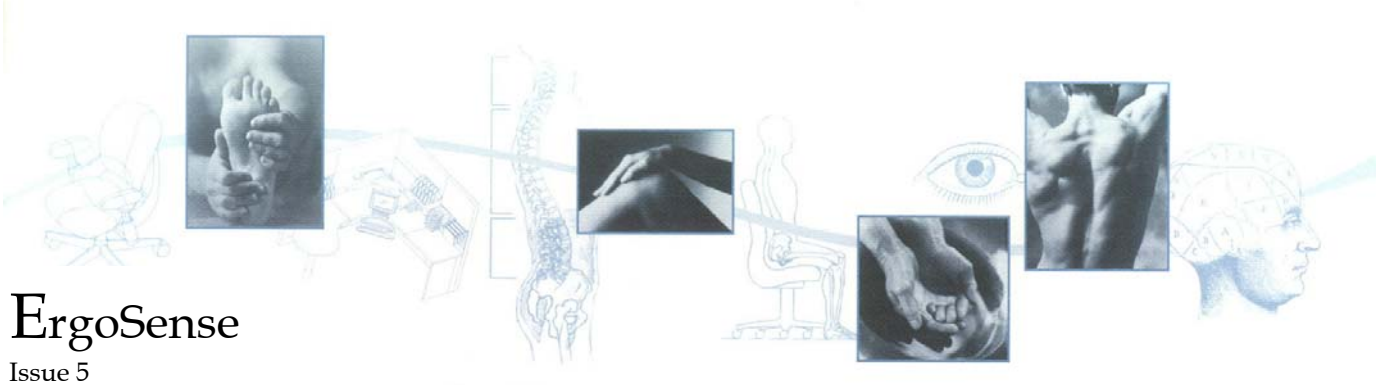

ErgoSense
Issue 5

The Importance of Proper Seating

It is very important to ensure that chairs used by computer operators support the range of optimal postures or such users.

There are two generally recommended postures for continuous users of VDTs:

- **Backward Leaning Posture**
- **Declined Thigh Posture**

The first is a modal posture recommended for computer users who alternate keying with reading the screen and other activities, while the second may be especially appropriate with data entry (or "hand-intensive") users or as well as a break or change for other users.

The **backward leaning posture** is globally described as similar to the posture that one assumes while driving a car.

The trunk to upper leg angle is greater than ninety degrees, preferably approaching 110-120 degrees. The legs are extended slightly forward. Research has shown that both inter-vertebral disc pressure and muscle activity in the back are minimized with such an upper leg-to-torso angle.

Thus, the fundamental concept behind the "backward leaning" posture is that opening up the upper leg-to-torso angle beyond 90 degrees minimizes disc pressure and muscle activity and puts the backbone in proper alignment.

The same objective can be accomplished by the **declined thigh posture**; sitting with the upper legs angled downward.

This can be done by raising the seat pan of an appropriately designed chair and tilting the seat pan forward a few degrees. This posture can be globally thought of as a forward "drafting-table" posture and may be especially good for someone doing intensive keying or mousing.

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The chair features needed to support these postures for computer users are:

- The chair should have a backrest at least 19 inches (and preferably 20-21 inches) high. This is so that, when the user assumes a backward leaning posture, there is back support available up to the shoulder level. On the other hand, beware that chair backs that exceed this height range by more than a few inches may be too high for small users and actually restrict head and neck movement.

- The seat back of the chair and the seat pan of the chair should tilt independently of each other. That is, when the user leans back in the chair, the seat pan should not rise in the front.

- The front edge of the seat pan should be rounded (often referred to as a "waterfall" front).

- The seat pan should tilt.

- The backward tilt of the seat back should be lockable. In other words, it should not take constant pressure against the back of the chair to keep it in at a reclined angle. Ideally, the mode of the chair should be changeable by the user so that at times it moves with you (active mode, non-locked) and, when selected, it becomes "passive" with the seat back angle locked regardless of the position of the user.

The "active" mode is good for someone conversing on the telephone, meeting with others conversationally or someone who is getting in and out of the chair frequently. The "passive" mode is ideal for periods of time when the user is seated and keying or mousing.

- The chair back should provide support for the lumbar region of the lower back.

- The height of the chair should be adjustable from a seated position. This is because users are encouraged to shift their weight and alter their posture slightly on an hourly basis. It is much more likely that users will use chair adjustments when they are available from a seated position.

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- If chairs have arm rests, the arm rests should be height- and width-adjustable. This is because if the user is to have his/her elbow at 90 degrees, the arm must be supported in this position. Leaning up or down to use a fixed arm support does not allow one to key in an optimal posture. Arms that are too narrowly placed for a large user will be uncomfortable, and arms that are too widely placed for a smaller user can cause shoulder/elbow abduction.

- Chairs should have a five-legged base to maximize stability.

Ergonomic education is also imperative for computer users. Users must be aware of the total range of optimal postures and they must know how to operate chair features. Users should be encouraged to adjust their chairs and shift their positions several times during the workday. And, finally, users should be encouraged to stand, walk, and exercise often throughout the day.

This paper was written for The Ergonomics Consortium by Dr. Carla Springer. Dr. Springer is a Board Certified Professional Ergonomist with M.A. and Ph.D. degrees in cognitive psychology and statistics from the University of Colorado. She has been an active participant on both national and international forums on VDT ergonomics, and is a member of the ANSI committee responsible for revising the HFES 100 standard for the VDT. Dr. Springer has been a member of The Ergonomics Consortium since its inception.