



Humanics Ergonomics

Rethinking ergonomic chairs

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[More about sitting postures and "ergonomic seating"](#)

Rethinking Sitting Rani Lueder, CPE

There is no universal chair. The idea of a chair is only present in examples.

Aristotle, 384-322 B.C. (Baird, Philosophic Classics)

Imagine that. More than 23 centuries since Aristotle's treatise on the chair and we're still confused. Aristotle argued that chairs don't exist in the abstract; "the chair" can only be understood by example and in its context (he called "elements").

Aristotle would have made a great ergonomist. One of our ergonomics first principles is that there is no such thing as an ergonomic product without the user and context.

No chair works for every user and situation. Referring to an "ergonomic chair" also distorts the situation; many or most of these chairs incorporate some features that are generally better than most and other features that are generally worse.

The common misuse of this term leads to confusion. Supervisors and managers stridently insist that employees sit in entirely inappropriate "ergonomic chairs". The authority of the label clouds their thinking.

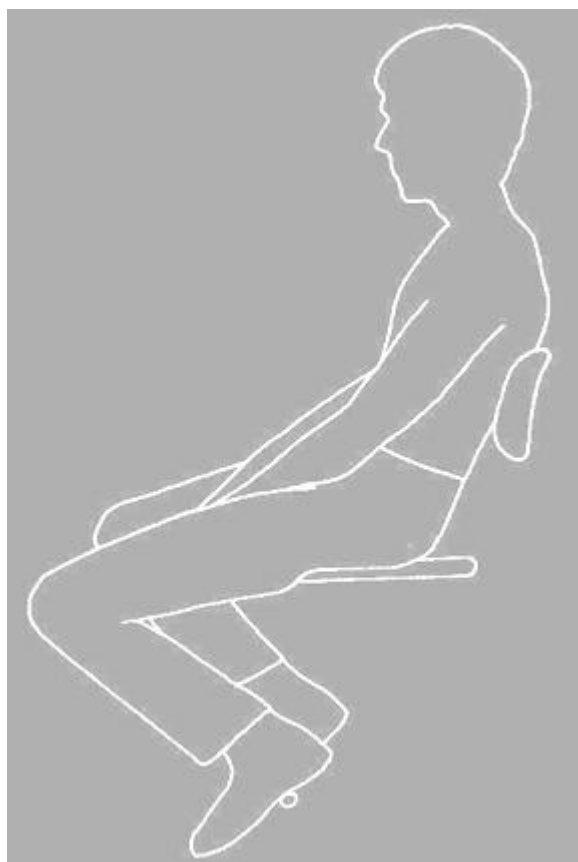
Of course, some chairs clearly accommodate more users than others. Sitters are prone to adjust some chairs than others and to adjust some appropriately. Some chairs support more users' backs for a greater proportion of the day.

But let's try to be honest about the issues. The hype and misinformation holds us back.

These are some of my top contenders ...

1. Don't count adjustments.

Am I imagining it, or is that the new trend? Adjustments vary in importance, obviousness, ease and ranges of adjustment and the interplay with the seat.



From Corlett & Eklund (1984)
How does a backrest work?
Graphic used with permission.

Some adjustments are value added. They benefit some users, but there is little risk when unused or unneeded (e.g., sliding width-adjustable armrests). Other adjustments are often essential but may require training (e.g., backrest tension).

Some adjustments benefit only certain users. Can your employees with hand symptoms marshal enough grip strength (or pinch grip) to adjust them? And why are most chair controls on the same side as most hand injuries?

The number of adjustments is not the thing. Are they necessary? Do they make sense? Is adjustment easy, straightforward and seamless? Can untrained users find their way?

Ask yourself also if users would ever be able to adjust the chair in less than a minute. Timing does not hinge on the number of adjustments. Some chairs with few adjustments are more confusing and take longer to adjust than chairs with more controls.

Sidebar: Give employees a clear-cut order of adjustments to cut adjustment time.

2. A "comfortable chair" is not necessarily the most appropriate chair.

Sometimes it is. Sometimes it isn't. The trouble is that so many of us (especially in the US) assume postures that minimize muscle work. That is why most of us would rather sit than stand, why we slump, cross our legs and do the things our mother told us not to do.

Our postural habits are also deeply entrenched. Comfort is a fuzzy term that people tend to interpret and describe in their own unique ways. **Discomfort is more accessible.** It is specific and anchored in our direct experience. For this reason, ergonomists have largely replaced "comfort" with "[body part discomfort surveys](#)", such as OSHA uses.

Either way you cut it, seat evaluations require proper user training and a reasonable work environment. Look further if users' symptoms improve after a decent trial period... you may be on to something.

3. Don't confuse seat height and depth.

Many people discuss seat height and depth in the same breath, as if they were giving marching orders for how to sit. Yet these considerations are quite different.

The seat depth issue is crucial. Overly deep seats may impact pressure-sensitive nerves under users' legs. They constrain sitting and may keep sitters from their backrests.

[Seat height is a different animal entirely.](#) **As long as the user's feet are comfortably supported**, it is all right if they sit an inch or two higher than their knees (though sitting upright and below the knees might strain the back).

In fact, seating studies indicate that when given a choice, users consistently sit higher than their knees (popliteal height). Doing so can also increase freedom of movement, improve reach and potentially reduce loads on the back.

Traditional seat height guidelines developed in the early 1950's assumed that high seats caused leg swelling (edema). Yet research indicates the real culprit is lack of movement, not high seats. Incorporating leg movement can eliminate leg edema. [More on this topic.](#)

4. Forget the one-inch range of lumbar heights in the population.

That rumor started in the late 1960's. It is why to this day, most chairs provide insufficient backrest height adjustability.

Note to dealers: Just look at people's backsides!

News flash: The necessary range of adjustability of the lumbar is both increasing and moving up. That's because in the US (and this seems to be something uniquely American), our bottoms continue to get bigger. Bigger bottoms require higher and deeper lumbar supports (not to mention deeper seat pans and forward armrests).

5. As a rule, the forward sloping seat is a failed concept.

Research provides scant evidence that forward sloping seats actually promote a lumbar curve when used in realistic work environments. Notable exceptions to this rule are chairs that enable users to maintain a stable posture (and pelvis) while sitting in a forward sloping seat. [This one, for example.](#) A few degrees forward may work, though, if users can find a stable way to sit.

6. Help your employees find a way to manage in the real world.

Ergonomics training can be invaluable, but it can also waste everyone's time.

As a rule, employees want to find a pain-free way to work, but they manage poorly at best. Most of today's office workers experience moderate to severe discomfort on a regular basis. Most spend the bulk of their day working in awkward postures with their back unsupported.

Quite often, the many facets of an organizational culture systematically impede behaviors that ergonomists commonly recommend. **This will continue to be our biggest stumbling block.**

Even so, seating has advanced remarkably. We may disagree on individual issues, but there is little doubt that seating continues to make great strides. We've witnessed a new and improved generation of seats every decade since the 1950's. The most innovative of these are forging territories that were unthinkable even a decade ago.

Just imagine what the old stagecoach riders had to put up with two centuries ago, sitting all day on hardwood slats in a fixed upright position where the only movement possible came from impact forces of the bouncing coach. Hold on to your hats, watch for what's next.

Rani Lueder, CPE has consulted in Occupational Ergonomics and product design research for over 20 years. Her activities in sitting and seating include co-organizing the Second International Symposium on Seating, held in Tokyo. Her second edited book, on sitting postures ([Taylor & Francis](#)), is sold worldwide. She continues to consult on an extended retainer with Waseda University Human Seating Lab and with the Japan Institute of Human Posture Research. She served on the American National Standards Committee ANSI BSR/HFES 100. She is currently co-editing a book on [ergonomics for children](#) with Valerie Berg Rice. [Contact her.](#)

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