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# Back Basics: How Work Gets On Your Back

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As with all great discoveries, this one begins with a perplexing problem: the rising incidence of back problems, particularly among the 75% of workers in desk jobs.

So researchers at Steelcase and the University of Vermont, Michigan State University and Cornell University began to investigate. For some studies, they actually attached light-emitting diodes to the backs of 10 men and 10 women, using time-lapse photography to observe what happened when they sat in different positions.

What they found is changing the way high-performance seating works - in offices, cars, aircraft, or anywhere else. They learned that:

- Upper and lower backs move independently, not as a single unit. When you recline, your upper back moves backward but your lower back arches forward. That leaves a gap between the backrest and your lower back - so you tend to let your lower back sag or hunch.
- Each of us adjusts our 12 upper back “joints” and five lower ones in distinct ways, and we change that unique “spineprint” throughout the day as muscles tire or our activities change in one way or another.
- Lower backs need a small but constant level of support, rising slightly as you recline. Upper backs, however, need more support and the amount increases dramatically as you recline.
- When you recline, you move out of your “vision and reach zone” - the areas where you can comfortably see and reach. To compensate, you stretch or squint - or return to the upright position.

These observations fit with important previous studies that found two critical requirements of good seating: back support and freedom to change posture. In fact, one study revealed that changing posture helps the flow of nutrient-rich fluids around the discs of the back.

Together, these fascinating “back facts” drew Steelcase and a team of 27 scientists to far-reaching conclusions about characteristics of the ideal office chair.

Some were, of course, contradictory. For instance, how can a chair support the body, yet provide unrestricted natural movement? But after four years of research, development and testing - and 23 patents later - the Steelcase design team and IDEO (widely regarded as North America’s most innovative industrial design firm) came up with the Leap® chair, it’s Live Back® technology and Natural Glide® mechanism.

Introduced at the NeoCon show in June, 1999, Leap does everything your spine does:

- Its upper and lower back supports work independently. It encourages you to keep moving while you are sitting because your back never tires from having to support an uncomfortable position.
- It changes shape to mimic the way your spine is moving. There’s no gap behind your lower back when you recline - and no more hunching in order to rest.
- It has separate upper and lower back controls. You can also adjust the rate of increase in the “push-back” from the upper back rest. This means many people can use the same chair - larger people can get a rapid increase in upper-back support as they recline, while smaller people can get a more gradual increase - something they can’t do now.
- When you recline, the Leap seat glides forward, so you stay within your “vision and reach zone”. And the seat edge angle control lowers only the front portion of the seat to keep pressure off your thighs and increase pelvic support.

This powerful combination of research and product development has created a work chair that follows three critical principles of ergonomics: it supports natural postures, provides stability, and allows freedom of movement. Steelcase is so convinced of its usefulness that it plans to make Leap technology available by license to other industries and organizations interested in providing high-performance seating.