

“From birth, man carries the weight of gravity on his shoulders. He is bolted to earth. But man has only to sink beneath the surface and he is free.”

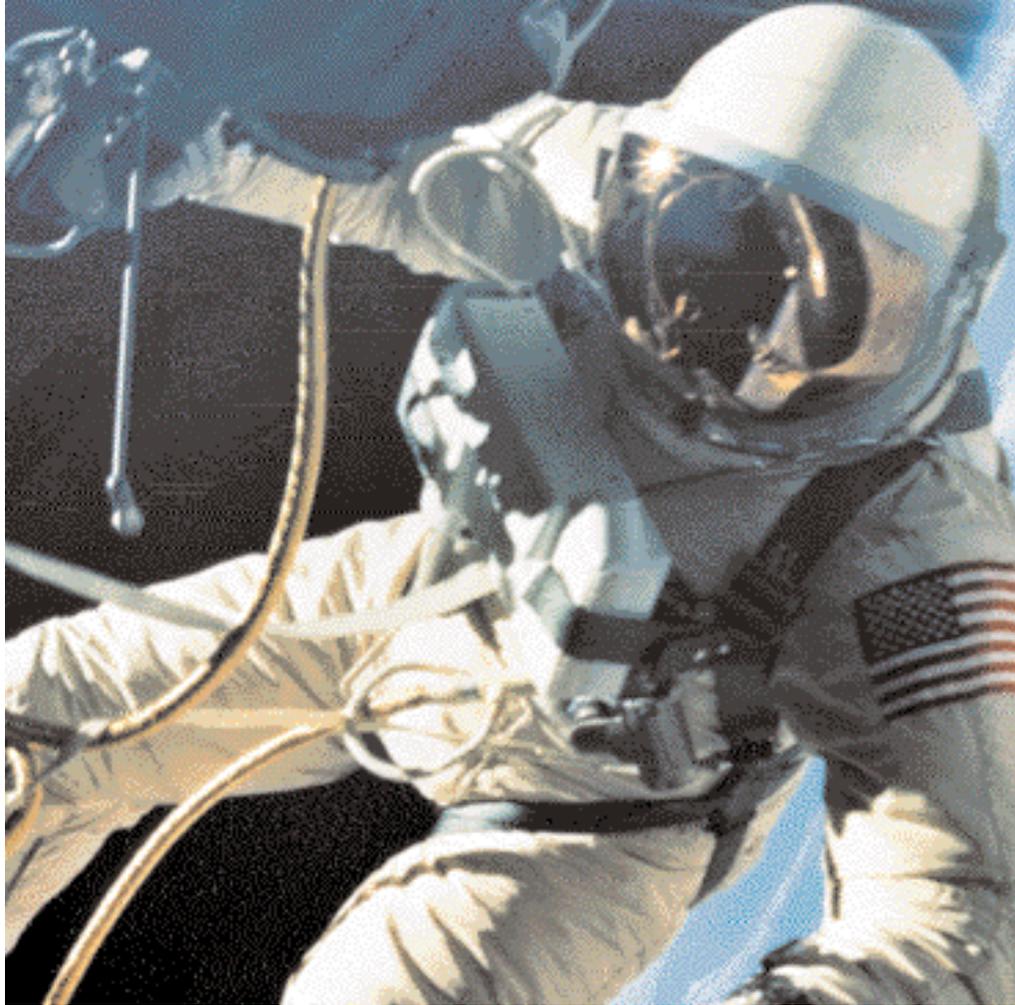
— Jacques Cousteau

Sitting Up

By Mark Taylor

Straight:

Why Posture Ain't What It Used To Be



Without gravity, life couldn't exist as we know it. As the comedian, Thomas Wright, put it: "It's a good thing we have gravity...or else when birds died, they'd just stay right up there. Hunters would be all confused." Seriously, though, in spite of the obvious benefits, however, gravity can take a toll on the human form, especially in the form of awkward postures. »

Seated Posture Specifics

Here are a few specific characteristics of the body's neutral, preferred posture:

TORSO—In the zero-gravity posture, the torso is positioned at a 128-degree angle to the legs. When we contrast this dramatic open angle with the typical 90-degree posture normally associated with sitting, it's no surprise that back injuries and repetitive stress injuries are on the rise. When seated at a workstation, the backrest angle and seat angle should be adjusted separately to achieve a most open angle. While a 128-degree angle is probably not going to be practical for most seated workers, we can still achieve more equidistant spacing of the vertebrae dramatically as we move past 90-degree posture. Amazingly, many furniture and seating manufacturers still recommend 90-degree posture in their literature and on their websites. Sadly, most sales and customer service reps are woefully unaware of the benefits of open posture. Rather than admit they don't know, they'll try to tell a customer how to sit, and they generally recommend the totally wrong posture and workstation setup.

LEGS AND FEET—Plantar flexion is the term used to describe the neutral position of the feet. This basically means that they are slightly pointed in and down-when we're floating. In a seated position, the lower leg should be at an open angle to the upper leg (i.e., greater than 90-degrees). When the feet are flat on the floor and scooted forward (not directly under the chair, or straight down from the edge of the seat, but out in front of the user), the angle between the top of the foot and shin is more open. Surprisingly, many seated workers still haven't figured out that the front edge of the seat should not touch the soft tissue area behind the knee. Contact with this popliteal area impedes circulation to the lower leg, and can cause the feet to fall asleep, etc.

HEAD AND NECK—The natural position of the head is to have the chin pointed slightly downward, which means that your line of sight is also slightly down. The real damage occurs for users whose monitors are too high, or who frequently crane their neck back to peer at the monitor through bifocals.

HANDS—Much work has been done to study proper hand postures. The neutral body position for the hands is slightly turned, slightly apart, and slightly angled down. The need for ergonomic keyboards has led to a plethora of "ergo" claimants. Generally speaking, any keyboard tray that claims to be ergonomic should be highly adjustable and should allow for negative tilt, so that the hands can indeed angle slightly downward.

In search of better seated posture

Remember your grade school teacher, or your mother, reminding you to *sit up straight*? By straight, they meant what we now call a 90-degree posture, which refers to the angle between the torso and legs. It's a problem, though, because it's not the body's natural position. And sitting in such an unnatural posture causes all kinds of problems, as demonstrated in the growing tide of repetitive stress injuries.

But what is the body's preferred position? It would be easy to guess that a 180-degree (i.e., flat) posture is best. After all, that's the posture we use when we sleep, right? As it turns out, the flat posture is also an incorrect and unnatural position. Just ask any of the millions of humans who suffer from sleeplessness, tossing and turning all night, trying to find that elusive, natural position that will be most comfortable. In truth, the upright walking posture is actually closer to the body's preferred position, rotating the spine into the proper S-shaped curve. But the 180-degree posture really is not the body's natural position, whether you stand it up straight or lay it down flat.

When I learned to swim as a child, the first exercise we encountered in the pool was the Dead Man's Float. There we were, bobbing in the water in a relatively relaxed position (except for

holding our breath), unknowingly simulating the body's most natural, stress free position. Jacques Cousteau's description of a floating posture that defies the confines of gravity does, in fact, capture the essence of what our bodies prefer. The natural posture was studied extensively in the 1970's, during NASA's SkyLab experiments. In fact, the space agency actually did a number of underwater buoyancy tests on pos-



ture, using submerged and blindfolded astronauts in a "partial-G" environment to simulate the weightlessness of space. During the SkyLab missions, the space agency collected a variety of anthropometric data pertaining to the exact effects of weightlessness on the human form. Some of the effects the studied happen over time, like the deterioration

of muscle mass. But other effects are instantaneous, the most notable of which is the unique posture the body assumes in the absence of gravity. Perhaps you've noticed the distinctive position of astronauts floating in the weightlessness of space. The truth is, when gravity is no longer a factor, the human form, without exception, assumes what amounts to the Dead Man's Float position. NASA published its findings in the *Anthropometric Source Book*, and called this distinctive, natural posture neutral body posture. It is interesting that these studies occurred at the outset of the computer revolution, which would quickly introduce terms like repetitive stress injuries, cumulative trauma disorders, musculoskeletal disorders, and Carpal Tunnel Syndrome to mainstream America.

Finding that natural position

Dr. Jerome Conleton, with Texas A&M University's School of Rural Public Health, explains that this posture is also the balanced midpoint position of our muscles. "Flexion and tension, the pulling and counter pulling of the muscles, reveals the midpoint, natural position," he says. "And if you think about it, the body's most relaxed posture is also the body's position of maximum strength." As an example, Conleton points out that the standard

“readiness” posture of any athlete is nearer to the neutral body posture than it is to any other posture. “Think about a baseball game,” Congleton suggests, “and the posture a batter assumes. Or your golf swing. Or a biker’s position on his bike, or a football linebacker ready to spring across the line, or a boxer during a match. All of these athletes intuitively know what the body’s position of maximum strength is, and those postures emulate the body’s natural, preferred neutral posture.”

Dealing with gravity

So why all the buzz about neutral posture? After all, we don’t work in a gravity-free environment, so does the concept still apply in the workplace? Mark Benden, CPE and VP of Engineering for Texas-based Neutral Posture, Inc., says the answer is unequivocally yes. “When the body assumes the neutral posture, several things happen,” says Benden. “The most notable thing is that the vertebrae of the spinal column achieve equidistant spacing, which basically means there’s equal space on the front and back side of each disc. When we hunch forward (lordosis) or arch backward (kyphosis), we are placing pressure on one side of the disc. Equidistant spacing is what we’re trying to achieve in a seated position, which is hard to do with traditional flat seats and few adjustments.” Ironically, when most people ask about what posture they should be using, they want to picture a static posture. But the human body is made for motion, and dynamic postures are actually better. For an example of a static posture, simply hold your arm straight out from your body and leave it there, without moving it. The muscles fatigue and lactic acid (normally present in tissue) builds up. That same thing happens on a different scale when the body is in a static posture throughout the day, for instance when sitting at the keyboard in the same posture for hours on end. Once I worked in an office with a motion sensor that controlled the lights. I can’t tell you how many times a day I’d be sitting there working at my computer and the lights would go off. So I’d have to wave my arms up in the air to turn the lights back on. I was amazed to find that my posture was so static that the motion sensor couldn’t even detect enough motion to keep the lights on. I felt like an ancient sloth or something, expecting to find moss growing on me.

According to Dr. Congleton, the general rule of thumb for seated posture should be: The more open, the better. This applies primarily to the angle between the torso and thighs, but also to the relationship between the thigh and the lower leg, the hands, and the feet and the lower leg. With regards to furniture and seating design, the term ergonomic should, to some degree, be synonymous with highly adjustable. Adjustability is really the only way to accommodate the vast range of body sizes and shapes and tasks in the computerized workplace. Our grade school teachers would be interested to know that the space-age office will include a space-age concept of posture — a neutral posture that’s as old as the human form!

!S!!