

SMART SITTING

Correct sitting for a healthy spine.

by
Mary Bond, MA

Prisoner of the Chair

Last month, after news of her promotion, Alison splurged on an expensive ergonomic chair. In the past year she'd spent a fortune on medical tests, physical therapy and painkilling drugs. In the long run, she figured, the chair would save money.

The pain was a mystery. Alison hadn't been in any car accidents--had never even broken a bone. She'd kept in shape with yoga and running. Lately, though, she'd been going in to the office on weekends. The pain in her back was always worse after that.

Alison is a willowy blonde. She put herself through design school doing runway modeling, and still walks like a model, with her hips thrust forward. Her chest caves in a little, but she's so pretty you don't find it unattractive. She looks a bit like Gwyneth Paltrow.

It's been six weeks now and Alison is frustrated. She's tried every one of the chair's adjustable features: seat angle, arm rest height, degree of lumbar support, head rest position. Initially each new setting feels comfy. Ahh, that's it. But within an hour her body is aching, a prisoner of the chair.

Habitual Posture

The amazing achievements of the technological age--from laser surgery to camera phones--seduce us into thinking that every problem can be solved by a gadget. Alison's chair supports her body in what looks like good alignment. But with all its bells and whistles, the chair cannot address the root of her problem, which is the tension around her tailbone.

Alison's tucked-under pelvis has less to do with modeling than with landing hard on her tailbone when she was ten. Her brother pushed her out of a tree. Rather than complain about the pain, she suffered in silence because she wasn't supposed to be climbing the tree. Because of an incident that occurred over twenty years ago, Alison sits too far back on her pelvis. The most elaborate ergonomics design on earth cannot support her because her habitual posture sabotages her body's balance.

Your Chair vs. Your Body

Alison is not alone in suffering from the way she sits. Seventy percent of Americans spend most of their waking lives sitting behind a steering wheel or in front of a computer screen. Whether the work we do at our desks is a joy or a chore, most of us are uncomfortable. Many are in downright pain.

Because chairs are ubiquitous in western culture, most people assume that sitting in them is natural. Our early ancestors, however, were nomads whose lives were a constant flow of physical activity--walking, hunting, gathering food, setting up and breaking down camps. For domestic tasks, they knelt or squatted; when they were tired they lay down and slept. They had no chairs and, most likely, no back pain.

In studies of present-day societies who squat rather than sit on chairs, researchers report lower rates of spinal disk degeneration (the cartilaginous cushions in between vertebrae) than in sitting cultures. In modern America, no one over the age of four squats. Our hips aren't flexible enough. But squatting in and of itself is not the basis for a healthy spine. What people in squatting cultures have over those in sitting cultures is that they move more in general. Movement pumps fluid through the disks, keeping them hydrated and nourished enough to sustain the wear and tear of daily living.

Western history does not mention chairs until the period when people began settling in one locale rather than roaming from place to place. The oldest chairs surviving from ancient cultures are from the tomb of Tutankhamen, an Egyptian pharaoh who died around 1352 BC, although depictions of dignitaries sitting in chairs date from 1500 years earlier. Chair sitting was not prevalent among common people until well into the industrial revolution in the early nineteenth century. So, although upper classes have been sitting in chairs for five millennia, ordinary people have been using them for only the past two hundred years. In that short period, human work and lifestyles have shifted drastically in ways that demand less and less motion from the body. The electronic age has sped up this cultural evolution even more. More people sit, and for twice as long, as

they did before World War II. Human bodies, however, have made no corresponding evolutionary changes--like the bodies of our early forebears, ours are engineered to move.

Prolonged sitting is associated with a long list of problems. Reduced circulation due to immobility means less oxygen reaches the brain, leading to headaches, poor concentration and fatigue. Pressure on the thighs from a chair seat reduces circulation and can lead to swollen ankles and varicose veins. The C-curved, slouched posture adopted by most sedentary workers puts uneven pressure on spinal disks, irritating spinal nerves and causing low back pain. Such posture also compresses internal organs and can be related to digestive and urogenital dysfunction. And, because the diaphragm cannot fully descend when the abdomen is compressed, the resulting upper chest breathing can lead to a host of symptoms associated with chronic hyperventilation--among them, aching muscles, lightheadedness, chest pain, anxiety and depression.

Forward leaning head--and over sixty percent of sedentary workers exhibit this tendency--strains the juncture between the neck and upper spine. This can result in an unattractive buildup of connective tissue known as *dowager's hump*. The forward head position can also lead to tension headaches, and eye and sinus problems.

The combination of slouching and forward head postures compresses a crucial area between the collarbone and neck. Tension here restricts nerves and blood vessels that run between the neck, arms and hands, causing various hand and wrist symptoms.

Appropriately, there is a lively debate about chair design among ergonomics researchers. Every year sees new chair designs based on revised considerations of seat pan shape, inclination and depth, seat back angle and contour, chair height and chair adjustability.

While modern chair designers have studied human structure, few of them seem to understand the kinetic nature of the body. The meaning of the word *ergonomics* reveals the limitations of research done from this perspective: *ergo* means "work", and *-nomics* has to do with "management." So an ergonomic chair is meant to manage human sitting for the purpose of production. The purpose of ergonomic design is worker productivity rather than worker well-being. A few ergonomic designs take the body's need for movement into account (see sidebar on the Swopper chair), but some highly touted chairs actually mitigate against movement by providing too much support for the spine.

SIDEBAR: "Of all the machines which civilization has invented for the torture of mankind... there are few which perform their work more pertinaciously, widely, or cruelly, than the chair." *James Hobson Aveling, MD (1879)*

Comfort

Many of us don't know how comfort really feels. We think we do, but our perception of comfort is compromised by marketing ideas about luxury and prestige. A cushy chair looks inviting. A chair with levers for individualized adjustment gives us the illusion of control. But without awareness, your body can ache as much at the end of a day in a thousand dollar chair as it did in the sixty dollar model. Chairs are only half of the comfort equation. The other half--the bigger half--is how we inhabit our bodies while we are sitting.

In modern usage, the word "comfort" implies relief, consolation, freedom from pain. But the ancient derivation means "to strengthen." Comfortable sitting, then, would seem to be an oxymoron, since sitting on a chair for extended periods of time is anything but strengthening. Nonetheless, modern life demands sitting. Perhaps if we can learn to sit in a way that respects the body's structural design, we will experience the essential meaning of comfort.

Active and Passive Sitting

How we sit depends on where we are, whom we're with, and what we're doing. How you might sit at the beach, on the deck of a boat, or in a movie theater is different from how you sit astride a horse or at the

gym, and different still from how you sit at your computer, in your shrink's office or at an election campaign meeting.

Sitting can be utterly passive or very active. It is the active kind--the sitting we do when we're engaged in mental or physical performance--that causes our bodies the most problem.

When you're lounging you have surrendered your body to gravity. With your feet elevated and your spine resting in the chaise, you are effectively horizontal. The moment you pick up a magazine and raise your head to read, you enter a different relationship with gravity. Whatever part of your body is oriented vertically needs support, either from below, by your own physical structure, or from behind by something external. When support from the environment is lacking, your body replaces it with muscular tension. When you persist in such tension, that part of your body loses its capacity to move freely. And, your potential for pain and injury rises. This is how the habit of reading in bed results in so many stiff necks.

When you're sitting in front of your computer or behind your cello, your relationship with gravity is more complex than when you are reclining and passive. With most of your body vertical, the base of your support is diminished. The challenge of sitting actively is to achieve a base that supports your structure while still allowing your torso to move. Chair design can help, but the real secret of comfort is in how your body relates to gravity while you are sitting.

Sitting Tight or Sitting Pretty?

Sit in the chair in which you do your most active sitting--at your computer, workbench or musical instrument. If it's not convenient to do this experiment in your work environment, select a chair of approximately the same height. Sit in a way that feels familiar, then settle into that posture as if you had been there for an hour.

Locate your sit bones, two knobs at the bottom of your buttocks. Where do you sense your weight distributed over these bones--more toward the back of them or farther forward? Is your tailbone contacting the seat?

Notice your legs. Estimate the percentage of your body's weight that is being supported by your legs. Ten percent? Twenty-five?

Consider your chest and abdomen. Is the center of your ribcage--the area of your heart--behind or above your abdomen? Is your breastbone behind or in line with your pubic bone? Does your trunk fold inward at your waistline?

Is your head poised above your chest or in front of it? Can your neck freely turn in all directions? Can you take an easy breath using your diaphragm? Does the lower part of your ribcage expand when you breathe? Or do you breathe only in the upper parts of your ribcage?

If you are leaning against the back of your chair, where does the backrest contact your spine?

Now explore bending forward, as if to reach for something across your desk. Do you do that by deepening the crease at your waist? By lowering your chest and rounding your shoulders?

Do you straighten up by tensing the muscles along your lower spine?

Introducing Pelvis and Spine

The tenets of smart sitting make the most sense if you understand something about the structural relationships between your hip joints, pelvis and spine.

For readers who are not familiar with human anatomy, the three-dimensional contours of the pelvis can be difficult to visualize. Especially if cardboard Halloween skeletons are the only ones you've ever seen. A real pelvis has depth and contour, like a two-tiered basin. The best way to understand the dimensionality of the pelvis is to get your hands on one. The following paragraphs lead you through a simple palpation of your own pelvis.

ILLUSTRATION: 1) pelvis 2) pelvis showing finger placement

*Place the third fingers of each hand on the dimples on either side of your sacrum. Then extend the webbing between your fingers and thumb along the bony crest of your pelvis just below your waist. Slide your thumbs forward along this crest until your thumb comes to a promontory. This point is what is commonly but incorrectly known as your hip bone. Its anatomical name is *anterior superior iliac spine*, or for short, the *ASIS*. With your thumb at this promontory and the webbing and heel of your hands resting along the iliac crest, let your fingers slide down along the sides of your buttocks. The bones deep to your buttocks muscles--*ilia*--are broad, wing-shaped structures that protect the back and sides of your lower abdomen.*

Now let your thumbs slide forward over the ASIS's and down into your groins, the creases between your pelvis and legs. Here the ilia connect to two branches of bone which merge in the center of your pelvis to form your pubic bone.

In back, your iliac wings connect to your sacrum at the *sacroiliac* joints. The slightly convex surfaces on the back of each ilium fit into slightly concave edges of the sacrum. The design of these joints allows for minute adjustments in your lower back as you walk and move. From back to front, the sacrum, ilia, and pubic bone form the rim of a shallow basin into which your intestines rest.

The lower tier of your pelvis is formed by two crescent-shaped bones which project down from beneath the sacroiliac joints and merge with the underside of the pubic bone in front.

Place your right hand between your legs and reach back to touch your left sit bone. Then "walk" your finger forward along a bony rim to your groin. Feel how the rim merges with your pubic bone.

This part of the pelvis is called the *ischium*, and the two rims form a basin about the size of a large cappuccino cup. Two knobs at the bottom of the rims, the *ischial tuberosities*, are commonly called the "sit bones." Your bladder sits within the lower pelvic basin, and the uterus rests just above it. The angle at which the pelvis sits on the tuberosities can affect the function of these pelvic organs.

*Roll your pelvis backwards across your sit bones towards your coccyx, then forward over the ischial rims toward your pubic bone. This rolling motion takes place through your hip joints. Your thigh bone--*femur*--has a rounded top approximately the size of a ping-pong ball (*the "head" of the femur*) which fits into a socket located near the bottom of each iliac wing. When you rock your pelvis back and forth, you are rotating your ilia around the femoral head.*

Shouldn't My Spine Be Straight?

ILLUSTRATION: Rolfing® logo

Balanced sitting posture requires a slight forward inclination of the pelvis. This inclination results in a slight forward curve of the lower back, which many readers have been taught is wrong. To understand the logic of this alignment, we need to understand the nature of the spine.

When a body is well aligned, gravity's vertical force travels directly through the central core of the body. Most readers will have seen an illustration of good posture in which the ear, tip of shoulder, and centers of hip, knee and ankle joints are plumb. For many years physical educators taught vertical alignment by positioning the spine itself in a straight line--students were lined up with their backs pressed against a wall. While no well-educated contemporary fitness professional espouses this approach, it has unfortunately influenced cultural beliefs about the body.

The twenty-four vertebrae of the spine overlap one another like shingles, with their individualized contours and articulations prescribing three natural curves. The two forward curves--with the convex surfaces facing front--are called *lordosis*. They occur in the neck and lower back. The concavity in the upper back is called *kyphosis*.

The curves in the spine provide shock absorption. When we walk, every heel strike sends an impact up into the spine. The curvatures distribute the pressures of locomotion, preventing damage to the vertebral disks and to the delicate internal organs that are suspended from the front of the spine. Human walking, jumping, leaping, falling and lifting--all the myriad ways that life loads the spine--would look very different if our spines were straight.

Some readers may have heard the words kyphosis and lordosis used to describe poor posture. Kyphosis or lordosis can become problems when curvatures are so set by habitual muscular tension and connective tissue adhesion that they lose resilience and adaptability--kyphotic areas may become unable to straighten; lordotic areas, unable to bend. The spinal curves themselves are beneficial so long as they can move.

Restriction in any one of the spine's curvatures causes compensatory adjustments to the muscles and joints up or down the line. And, because the sacrum is embedded between the ilia, any movement of the pelvic bones will also affect the curvatures, particularly the lumbar lordosis.

This means that when you rock your pelvis forward toward the pubic bone you increase your lumbar lordosis. This angle of the pelvis is commonly known as "*anterior pelvic tilt.*" When you rock your pelvis back toward your tailbone, flexing the spine and diminishing your natural lordosis, you are in "*posterior pelvic tilt.*" Sitting in this manner for an extended period puts uneven pressure on lumbar disks, over-stretches the sacroiliac joints, stresses spinal muscles and compromises the curvatures in the upper spine and neck. Pelvis-to-spine relationships are more intricate than this short discussion implies, but to understand smart sitting, anterior and posterior tilt are enough to consider.

Smart Sitting Explorations

For best support of your pelvis and spine, your chair seat should be high enough that your thighs angle slightly downward toward the floor. This will roll your pelvis forward and induce a mild lordotic curve in your lumbar spine.

Find a chair that seats you with your thighs angling down, and which has a firm, flat surface, neither contoured nor thickly padded. Place a telephone book or folded towel in the seat pan if it is contoured, or if the chair is too low. Put the phone book under your feet if the chair is too high. For now, sit on the chair as if it were a bench, not leaning against the backrest.

Slouching

To begin our exploration of sitting, we'll examine some features of poor sitting posture.

Go ahead and slouch as you might at the end of a long day. If you are like most people, your body's weight falls to the back edge of your sit bones. Your tailbone tucks under, narrowing your lower pelvic basin, and your lumbar spine curves backwards, reducing its lordosis. You may feel strain in your sacroiliac joints, possibly even pressure on your tailbone.

Your shoulders will have rounded and your sternum dropped so that your ribcage seems to be resting on your abdomen. Notice that your intestines are being compressed into your pelvis. Notice also that your head leans forward in front of your chest, and that this creates a bulge at the base of your neck.

Be aware of your breathing in this position. It's impossible to take a full, easy breath. Your diaphragm is prevented from descending by the pressure of your internal organs, and your ribs can't rise because of pressure from your neck and shoulders above.

Test the range of motion of your neck when you sit in a C-curved posture. How far behind you are you able to look in each direction?

Many people assume that a slouched sitting posture is due to laziness in the spine and shoulder muscles, and that the old admonitions--"sit up straight; shoulders back!"--are all we need to put it right. But try it. So long as your pelvis is rolled back, you can't maintain an erect trunk for more than a few minutes. Unless your base of support can be transferred forward, nothing you do to improve the configuration of your upper body will be sustainable. While it's true that underactive spinal muscles contribute to poor posture, the main cause of poor sitting posture is lack of support from the pelvis and legs.

ILLUSTRATION: anterior and posterior pelvis positions

Supported Sitting

To come out of the slouch, simply roll your pelvis forward, toward your pubic bone. Do this before making adjustments to your neck, shoulders or upper trunk.

The change in your foundation will distribute your weight slightly in front of your sit bones, with part of your weight on your thighs. Your weight will be distributed about 60 percent through your pelvis, and 40 percent through your legs and feet.

Allow your spine and trunk to adjust to the change in your foundation. Your lumbar spine should now curve forward, generating a lift in your chest and throat. This in turn supports a more elevated positioning of your head.

Notice that you can see farther behind you when you turn your neck from this position. Notice that breathing is easier than before.

With your weight resting on your legs, there is no pressure on your sacrum or tailbone. Instead, your sacrum rests between your ilia in a way that stabilizes the sacroiliac joints. Lumbar extension gives your abdominal organs more space in which to do their work, and with your diaphragm free to descend, you also have more breathing room.

Sitting with a slight lumbar lordosis gives your body its broadest base of support. *To sense this, slowly alternate between the anterior and posterior positions of your pelvis. As you do this, pay attention to changing sensations in your legs and feet.* In the posterior position your legs feel relatively light, as if they are just grazing the surface of the floor. With little weight being born through your legs and feet, your base of support is small, consisting of only your sit bones and tailbone. When your pelvis rolls forward, your legs feel weighted and your feet seem to have more connection with the ground. In this conformation, your base of support covers the entire area between your feet and your sit bones.

Smart sitting requires that your body be adaptable in pelvis, spine, chest and shoulders, and neck. If any of these regions is stiff you won't be able to sit to best advantage. Readers who have tight muscles in the backs of the legs may find the more forward position of the pelvis uncomfortable. Refer to the sidebar for help with short hamstrings. Others may have become aware that their chest does not rise enough to let the pelvis roll forward. Not being able to sit smart can also be an indication that your body needs attention with exercise, structural bodywork or both.

SIDEBAR: Hamstring release with a tennis ball

For this exercise, sit on a slightly padded surface. Place a tennis ball just in front of your right sit bone. The tight tissues you feel there are the overlapping tendons of the three hamstring muscles which attach to the tuberosity. By slowly rolling your pelvis over the ball you can apply pressure into these tendons, sending release through the whole muscle group. Because the tendons are tight, you may experience some discomfort, so pace yourself. You will need to repeat this for several months to render the tissues pliable. If you notice a sharp or radiating pain, adjust the angle of your movement to avoid irritating the sciatic nerve. Remember to breathe. Massage slowly for about a minute, the duration of eight slow breaths. If you then stand and bend over, you will notice significantly more ease in your right hip. Be sure to massage the other side. Then test whether sitting just in front of your sit bones feels easier than before.

SIDEBAR: Physio-ball sitting

A pleasant way to relax your hips for sitting, and for general postural improvement, is to sit on a large exercise ball. Have the ball less than fully inflated so it presents a cushy surface. Sitting on the ball should feel good. Pretend that the ball is an old-fashioned ink pad, and your buttocks and thighs are the stamp. Your job is to imbue every inch of the stamp with ink by shifting your weight through your pelvis in every direction. Be sure to plant your feet firmly on the floor as you do this so there's no danger of the ball rolling out from under you. Entertain the idea that the ball is coming up to meet your pelvis: release your weight into the support being offered. You are teaching your body to accept support. When you stand up you will notice a loosening in your hips. Try to sustain the ease in your pelvis as you sit on an ordinary chair.

Bending Over

From picking up a child's toy to lining up a golf shot, from brushing your teeth to hefting a grocery bag, bending over and straightening up are actions we make countless times a day. Correct performance of

these simple actions is essential to the health of your spine. Bending and straightening correctly from the seated position is a primer for doing it right when you're standing up.

In the self-assessment at the beginning of this article, many readers will have noticed that they bent over from the waist, and that chest and shoulders folded inward. Bending over in this manner is the inevitable result of sitting too far back on the pelvis. Straightening up from this position over-stresses muscles of the lower back.

If, instead, you initiate your forward motion from the 60/40 balance we have been developing, you will find that you can lean your torso forward by using your hip joints as hinges. When you tip forward this way, you will feel your body weight transferred down your legs into your feet. Then, when you straighten up, you can use your legs for leverage. Try this now.

Sit with your weight resting just in front of your sit bones. Take a few easy breaths, low in your ribcage, and allow your breath to elevate your trunk and throat. Then gently lean your whole torso forward by hinging at your hip joints. Notice that you can lean forward without having to round your back or compress your abdomen. If this action feels awkward, check whether you may have unconsciously braced the muscles of your hips and pelvis. Relax, letting your weight settle into the chair, and try the lean again.

To return to upright, push your feet lightly down into the floor. This action reopens the angle at your groin and stimulates the extensor muscles of your spine. Notice how holistic the action is--instead of over-stressing your low back muscles, you use your legs and whole spine to regain the upright position.

As you repeat the bending and straightening exploration, pay attention to your sense of your pelvic floor. When you bend forward, your sit bones move apart ever so slightly. This may make your perineum feel exposed or vulnerable. When you return to upright, be careful not to tighten and close the area around your tailbone. A tendency to guard the perineum is even more evident when you bend over from a standing position. Doing so restricts mobility in both hips and spine.

Because this region of the body is so vulnerable, many people carry unconscious tension in both the perineum and surrounding muscles. Almost everyone has experienced some degree of trauma to this sensitive area, be it so mundane an event as falling off your bicycle, or something as traumatic as sexual abuse. It's a natural place to need protection. However chronic tension in this area drags on the sacrum, restricting movement of the hips and diminishing freedom of the whole spine. Learning to sit smart is thus not just an end in itself, but has the additional benefit of relaxing chronic tension in the pelvic region.

Experiment with a simple task that involves writing. Notice how it feels to use your hip joints to incline your body toward your writing surface. You do not have to curl yourself into a ball whenever you sign your name.

SIDEBAR: Work Surfaces

Smart sitting will necessitate some reorganization of your work station. You'll find that because you're sitting more erect, your work surface, keyboard and monitor will need to be raised.

Perceptual Fine Tuning

How supported and grounded your body feels contributes to your emotional outlook. You can use the link between perception and posture to anchor your new smart sitting habits. Take a few minutes to observe differences in perception between various sitting choices.

Begin by sitting in your habitual way. *Imagine yourself in a social context--a business lunch, perhaps. Notice your attitude toward others when you sit in a typical slouched posture. Then change your base of support by reorienting your pelvis, legs and spine. Now how do you view the situation? The people?*

Possible variations in your viewpoint include curiosity, interest and openness as compared with boredom, criticism, or defensiveness. Of course, the true test will come when you experiment in real time, with real people.

Now imagine a threatening situation. In which seated posture do you feel most grounded and resourceful?

A powerful way to reinforce the smart sitting habit is by practicing the sensations, attitudes and viewpoints that correlate with it.

Keys to Smart Sitting

Let's review what we've covered so far. For active sitting, chair height should allow your hips to be slightly higher than your knees. This height orients the pelvis in a way that supports a mild lumbar lordosis, and lets part of the body's weight be born by the legs and feet.

Improved base of support changes the orientation of the upper body. The lumbar curve supports an opening in the abdomen and lift in the chest. Lift in the ribcage broadens the upper chest and collarbones. This in turn allows the shoulder blades to rest down along the back of the body. The shoulders are thus supported by the trunk, and the arms are suspended from the shoulders without residual tension in the neck. Relaxation in the upper shoulders protects against hand and wrist discomfort. The upward orientation of the body's central core supports the neck and head from below. These changes together facilitate improved breathing.

With the elongation provided by an elevated thorax and grounded pelvis, the spine is free to twist and bend in response to work activities without compressing vertebrae or straining the back muscles.

Always initiate changes in your sitting posture from the bottom up. Opening the chest and thrusting the shoulders back--as many people do when conscious of poor posture--does not result in a change in foundation. But the right support from your pelvis and legs automatically improves upper body alignment.

You'll notice that description of ideal sitting has not mentioned backrests. The spine is perfectly engineered to support the trunk. If the spine requires no backrest in the standing position, why should it require support when seated? When the pelvis and legs provide an adequate base of support for the spinal curvatures, the spine has no need to lean back on anything.

SIDEBAR: Seat Wedges

A dense foam wedge placed in your seat pan can make it easier for your pelvis to support your lumbar spine. With the back of the wedge 15% to 20% higher than the front, your thighs automatically incline downhill. Wedges are available from Relax the Back stores: www.relaxtheback.com. Inexpensive versions can be found at www.meyerdistributing.com.

Smart Reclining

Backrests come into play because modern work requires us to be sedentary much longer than is healthy for our bodies. It's not always possible in the middle of the work day to jump up and take a walk, even though that is what your body needs. Instead, we settle for the respite provided by a backrest--a few moments of socializing or introspection.

The trick is to lean back and accept the support of the chair without rolling your pelvis back and flattening out your lumbar curve. It is possible to do this if you lean straight back from the hips. This movement is the reverse of what you did to lean forward into activity. In this case you are leaning away from activity.

Try it now. *Start sitting smart, buttocks well back into the seat angle, but not leaning back at first. Then lean your upper torso straight back to the backrest. Once your middle back has contacted the seat back, then let your lumbar area relax.* This approach preserves a slight degree of lumbar lordosis. You'll know you've done it correctly if you feel your weight being born through your sit bones when you lean back, not through your sacrum or tailbone. Your abdomen should be open and your diaphragm free to descend.

But My Stomach Sticks Out!

Some readers may be concerned that sitting with a lordotic curve makes them more aware of a protruding abdomen, especially if they tend to carry excess weight in this area. The fault is not the new sitting

posture, but that you lack tone in the muscles that contain and stabilize your core. This is an indication that your body needs more exercise.

Body Fashion

Some readers may have the concern that people will regard their erect posture as an affectation. “Gee, you sure have great posture,” can be said in a derogatory tone, as if to make you wrong for choosing how to occupy your body. Because we all want connection with others, we can be swayed from our personal perceptions of what feels right.

There are fashions in body postures just as there are fashions in clothing, cars, or chair designs. Current body fashion espouses a cool and casual, yet intense look. Slouching is “in.” Smart sitting will gradually develop a body that is taller, more open, more peaceful and more powerful. Your new look may even be intimidating to some people. Let how you choose to organize your body be dictated by your own perceptions rather than by someone else’s judgment.

Lifestyle Choices

Because sitting immobile for hours at a time is unnatural to the body, there is no way to sit through forty hour weeks without suffering some consequences. Smart sitting can help. Having a good chair--which we’ll discuss in the next section--can help. But your body’s health and comfort may depend on your making some other, perhaps harder, choices.

The better your basic health and fitness, the more adaptable your body is to the abuse of prolonged sitting. A sedentary worker has as much need to stay in shape as a competitive athlete. You need to devote a minimum of three hours a week to physical exercise, preferably in activity that demands a variety of movements.

Good nutrition, although beyond the scope of this article, is an important part of your body’s ability to tolerate the stress of inactivity--as are good eating habits. The less physical activity you engage in, the less your need for caloric intake.

Many sedentary workers, ignoring their bodies’ demands for movement, unconsciously substitute eating for physical activity. Snacking over-stresses the digestive system with poor food choices. The more someone substitutes food for exercise, the less able she is to recognize the sensations of satisfied hunger, or her real cravings for physical movement.

In an ideal work situation, projects that necessitate sitting are interrupted with tasks that involve moving around. If your job keeps you nailed to your desk, you should interrupt your sitting with five minutes of activity every hour. And, unless you love your job, begin looking for a position that gives you more physical freedom.

It’s important to enjoy your work, to feel that what you are doing is meaningful. You’re far more likely to sit smart if you’re satisfied by your work than if you hate what you are doing.

Ergonomic Chairs

Ancient chairs were of two types--those which designated authority and those which provided rest for someone in authority. Over the centuries, chair designs evolved along these two tracks--for active or passive sitting. A chair meant for authority, like a throne, or a chair for alertness, like a church pew, tended to have straight lines and a 90° angle between seat and back. Chairs for respite developed padded and contoured seats and reclining backs.

Because modern sedentary work combines periods of active concentration with moments of relaxed social interaction, ergonomic designers attempt to achieve both types of seating in one chair. Researchers strive for designs that will relieve the stress of sitting for long hours. But ergonomics fosters body comfort only as a means to an end. A worker’s body is an economic factor. From the economic perspective, discomfort means a

need for support. Ignoring the body's kinetic nature, most chair designs err in the direction of over-support for the spine.

Researchers have determined that the most relaxing relationship between trunk and thigh is 135°--the open hip angle provided by a chaise or lounger. This angle is what happens when the body floats, in water, or in zero gravity. The posture fosters the lumbar lordosis, puts the least possible pressure on lumbar disks, and involves the smallest expenditure of energy by the spinal muscles.

Contemporary chair design has incorporated the open hip angle by inclining the seat back away from the seat pan. While opening the hip joint, this position puts the trunk into a semi-reclining position. The result is that the neck is forced forward in order to keep the head upright, putting undue tension on neck muscles. Designers solve this problem by making the upper part of the seat concave. While this C-curve allows the neck to be supported by the upper trunk, it pushes the chest down onto the abdomen, compressing the internal organs. The C-curve also flattens the lumbar spine, a problem designers solve by adding a forward curve to the lumbar area of the chair.

Lumbar support can be helpful for people whose lower backs are flexible. But if the spine has lost its natural lordosis, lumbar support will likely backfire. The person will simply press her spine into the support, and decrease the natural curve even more.

Chairs designed with a flush angle between back and seat leave no room for the mass of the buttocks. In this type of chair, the buttocks are pressed forward by the seat angle and the hips gradually slide down into the seat pan, tilting the pelvis back, and forcing the body's weight onto the sacrum. Some seats prevent sliding with a raised seat rail, but this tactic only increases posterior pelvic tilt by raising the thighs. The rail may also block circulation to the legs.

SIDEBAR: Airplane seats, car seats and some office chairs provide headrests to alleviate the forward position of the neck. But because headrests do not foster an alert mental state--alertness necessitates the head being free to move--they are impractical for work and disadvantageous in automobiles except as barriers to whiplash.

Marketing for one semi-reclining ergonomic chair touts a "stress-free position of muscles, tendons and ligaments in complete balance," and promises that the sitter will be "cradled in comfort." The fallacy of semi-reclined seating lies in the belief that the spine needs support from behind, and that diminished expenditure of muscular energy is a good thing.

This belief is based on the assumption that the body must be protected from gravity, a complete misunderstanding of the body's engineering. Our bodies are designed to interact with gravity by moving. In fact, our bodies dissipate the toxic physiological effects of stress by expending muscular energy. In addition, the pressure of gravitation keeps our bones healthy. Research shows that astronauts risk developing osteoporosis after ninety days in zero gravity. So a chair that is proud of its "zero gravity design"--the position of astronauts ascending into orbit--is of no use as support for a body that must function in gravity.

SIDEBAR: Contour prevents movement. Sling style strollers and infant carriers prevent a baby's natural desire for physical expression. Such devices are designed for convenience of caregivers and their prolonged use may interfere with normal development of the spine.

Buying a Chair

If you're planning on spending a bundle on an ergonomic chair, be sure there's a generous return policy. You won't know how well the chair fits you until you sit and work in it for a while. Be sure your chair has the following features:

- The chair should have enough space between the seat and back for your buttocks to swell into.
- The seat should adjust to a height that positions your hips higher than your knees.
- The seat should be firm and not contoured.
- The depth of the seat should be shorter than the length of your thighs.
- The seat back should adjust to support either the sacrum or the middle back or both.

When the sacrum feels firmly backed, the spine above it receives an automatic lift. This eliminates the need for lumbar support. Some people may need additional support behind the diaphragm, to help elevate the chest.

SIDEBAR: Some interesting chair designs

The Swopper Chair. Developed in Germany by Joseph and Dorle Glockl, respectively an engineer and an osteopath, the design promotes open groin angle and appropriate lumbar curve. The unique spring system facilitates multidimensional motion and release of the body's intrinsic energy while sitting. It's backless, however, so you'll need to do your lounging elsewhere. For more information see www.swopper.com.

The ZackBack Chair. Developed by former Mayo Clinic physical therapist Dennis Zacharkow, the adjustable back support system promotes diaphragmatic breathing with lower thoracic support, and stabilizes sacroiliac joints through sacral support while leaving the lumbar spine free to move. Mr. Zacharkow also offers a portable back support, the "yogaback" for adapting to cars and public seating. See www.zackback.com; www.yogaback.com.

The Balans Chair. The popular knee-rest chair has the benefit of seating the pelvis at the correct angle. The downside is that it puts pressure on the knees and leaves the feet ungrounded. It is also rather cumbersome, and awkward to get in and out of. See www.sitbalans.com.

Car Seats

Unfortunately the least fuel-efficient automobiles have the best designs for seating. The greater height of SUV's, vans and trucks offers sufficient head room for sitting with an elongated central core. In a small car, a tall person is forced to incline the seat to avoid pressing her head against the roof.

Smart sitting in a car requires compromise. Adjust your seat back to be as upright as possible. Fill in a bucket seat with dense padding. Wedge your buttocks as far back as you can into the crack between backrest and seat. This arrangement will leave several inches of space between your spine and the backrest. Add cushions or other props into this space to keep your body erect and to support your chest for breathing. Support in the lumbar area will be perfect for some people, while support higher up, just behind the diaphragm, will work better for others. Some drivers may need to fill in the entire space between spine and backrest. A variety of back support cushions is available online. My favorite is filled with buckwheat hulls which lets you mold the cushion to your needs. And, because the hulls move with your body, the cushion doesn't compress the way foam does. Learn about Bucky products at www.bucky.com.

Driving

How you use your legs while you drive influences how you sit in your car. Notice whether your weight is equally distributed on your buttocks. Many people anchor the driving leg by leaning into the right hip. This puts torque on the sacroiliac joints and can radiate strain up your spine to your neck.

Drivers commonly hold tension in the right groin, both to stabilize the leg for pressing on the gas pedal and in readiness for hitting the brakes. Operating the gas pedal should not require tension in the hip. Only your ankle has to move, so only your calf muscles need to work.

When you come to a stop, your hip must flex to lift your foot onto the brake pedal, but you will do this faster if your hip muscles are relaxed before being called into action. Muscle physiology dictates that when muscles are tense, they contract less efficiently than when they begin contraction from a relaxed state. So you'll actually be able to apply the brakes faster if your groin and hip are relaxed while you are driving.

Of course, no amount of relaxed awareness can relieve the stress of a nonstop six-hour drive across state. Your body is made to move. Leave earlier. Take several breaks of at least ten minutes during which you walk around vigorously. The hypnotic effect of driving induces you to tune out of your body, making it tempting to lounge by the coke machine rather than do what your body needs.

Encumbered by Conveniences

Throughout history humans have designed objects that have altered the way we use our bodies. The coordination and strength demanded by manipulation of primitive tools and weapons transformed human structure and contributed to our evolution as bipedal creatures.

From that time on, many of the things we have invented to make life easier have ended up causing us physical problems. In company with chairs and cars are assembly line manufacturing and all the devices of the electronic age. Sedentary work erodes our bodies, especially when combined with the hypnotic effect that electronic devices have on our minds. Electronic devices tether our eyes to monitors and glue our fingers to keys and “mice.” The combination of high mental stimulation and minimum physical release threatens to make us a culture that is numb to the body. The hyper kinetic nature of popular entertainment may be a cultural compensation for this numbness.

The problem is not in our inventiveness, but that our inventions have been created without body awareness. The material things we devise to serve us end up enslaving us. By awakening our body consciousness we create demand for body-friendly design in all our environments--workplaces and public places as well as in our homes.

Sitting Smart

In frustration, Alison googled “correct sitting” and found a helpful article on the internet. When she read the part about sitting forward of her sit bones, a light bulb went off. She’d heard yoga instructors say, “spread the sit bones” for years, but now she realized the instruction wasn’t just for a certain yoga pose, but for life in general. The adjustment of her pelvic angle made it easier to sit without slouching. Her spine and shoulders felt looser, and it even seemed easier to breathe.

The posture reminded her of sitting astride a horse--she had a feeling of command combined with a sense of easy mobility. She sat that way on her old office chair for a week without taking a single painkiller. She ignored the wry comments about her posture from her coworkers. Her back was feeling great.

The only problem now was that her new ergonomic chair didn’t fit her new posture. Luckily there was a sixty day return policy on the chair.