Posture for Health

By Tamara Mitchell
Edited by Sally Longyear

Ergonomics can be summarized as the study and practice of neutral posture during activities of daily living. The term ergonomics is derived from two Greek words: "erg", meaning work, and "nomoi", meaning natural laws.[1] In other words, the job of ergonomists is to analyze environments (e.g., cockpits, tool benches, workstations) and to make recommendations that will facilitate postures that follow the laws of physics and body mechanics. If the recommendations are implemented successfully, there will be reduced strain and wear and tear injury to the body.

Many people think that their problems will be solved if they buy the right equipment and have it adjusted to the correct height and location. Unfortunately, even with the best workplace setup, bad posture often occurs. This is because bad posture is a result of *bad habits*, *lack of awareness* of the balance of the body, inappropriate "ergonomic" products, and *muscles that have adjusted* to hold your body in awkward, slouched, or twisted positions.

Illustration courtesy of flickr.com. Joe Loong

Good Posture = Health

There is one thing that every health professional agrees on: good posture is critical to longevity and good health. Alexander Technique practitioners, Qi Gong and Yoga masters, neurologists, chiropractors, fitness experts and ergonomists all understand that keeping the body in alignment is of utmost importance. [1,2, 3, 4, 5]

Back pain is the most common cause of "work-related" disability in the United States. It is largely attributable to poor sitting postures throughout the entire day. [6] Individuals who sit too long both at work and at home are at high risk of back pain.

A recent small study of 22 healthy volunteers with no history of back pain or surgery determined through the use of MRIs that a 135º angle between the body and thighs *may* be the best position, which differs from the 90º posture that is most often illustrated in educational pieces.[6]

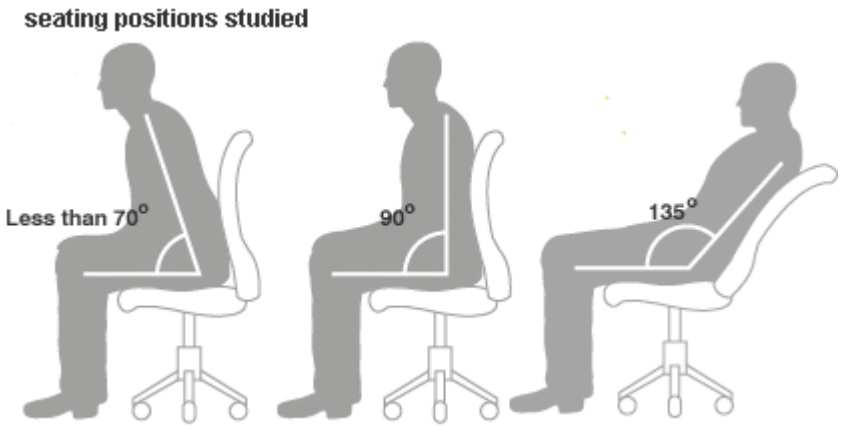


Illustration courtesy of BBC news(modified): http://news.bbc.co.uk/2/hi/health/6187080.stm

The researchers studied three postures: slouching, 90º upright body/thigh and 135º body/thigh backward leaning. The slouch position revealed a reduction in spinal disk height, indicating a lot of wear and tear. Disk misalignment was found to be a result of the upright posture. The 135º posture showed the least disk movement. [6]

Warning: This research it did not measure neck strain associated with all three postures, nor did it analyze postures that achieve an open hip angle and an upright posture (as pictured below). Until research is done that studies the effect of a posture that combines an open hip angle with an upright posture, we will not recommend that people work in a reclined posture because it puts too much strain on the neck muscles that have to hold the head upright.

The adult human head weighs between 10 and 20 pounds. When it is held forward (as shown above in all three postures), the neck, upper back, shoulders, and mid and lower back endure an exponentially greater load. The load increases with every inch the head is held forward. Therefore, ergonomists have generally encouraged sitting with a greater than 90º body/thigh posture, asking clients to sit high enough so the hips are slightly higher than the knees.

Illustration courtesy of
http://www.arbetslivsinstitutet.se/datorarbete/arbetsstallning_en.asp (modified)

Sitting on one leg is another posture that leads to misalignment of the spine. Sitting with one foot on the chair creates a spinal shift as one buttock is lower on the chair and the other one is higher on the foot. Soft tissue structures will stretch on one side and lengthen on the other, creating a muscle imbalance and joint changes.[7]

Squatting postures and meditation positions such as sitting cross-legged on the floor are quite different. The spine is elongated centrally and there is no deviation or side glide.[7]

Healthy Posture While Standing

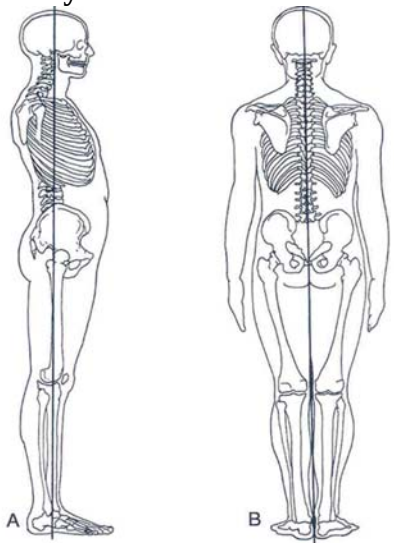


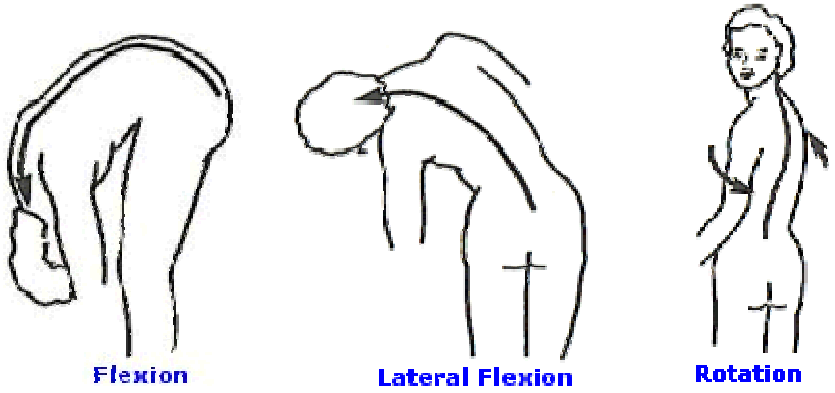
Illustration courtesy of 5

To maintain equilibrium in the standing position using the smallest amount of effort and energy, the vertebra from the neck to the tailbone must be aligned with the lower limbs with respect to the center of gravity.[5] A "Plumb Line," representing the gravity line, passes through the bodies of the lumbar, and most of the cervical, vertebrae.[5]

The human spine has curves, which gives it shock absorbing capacity and flexibility. The curvature of the vertebral column increases its resistance to compression forces. The curved spine has 10 times the stability of a straight spine.[5]

Posture and Qi

The spine functions as the main vertical support for all the internal organs and as a pathway for the nervous system, enervating not only the organs, but relaying sensory and motor information to the brain.[3] The spine provides the energetic flow of Qi into the internal organs from the rear of the body. The position of the spine directly affects the relationship and functioning of the internal organs.[3] Chronic flexion and rotation compresses the internal organs and impairs the flow of Qi and the fluids in the digestive tract.[3]



Illustrations courtesy of www.brianmac.demon.co.uk

Qi tends to stagnate at areas of the body that contain muscular tension. Stagnant Qi has a causative and symptomatic relationship with muscular tension.[3] According to traditional Chinese medicine, stagnant blood contains toxins from cellular metabolism that change the acid-alkaline balance of the blood, making it less able to absorb oxygen and Qi from the lungs. Flexed or rotated positions also affect the function of the lungs by reducing the volume of the lungs and the ability to expand and take in air.[3] Therefore, it is wise to avoid these awkward postures and minimize muscle tension to keep the blood and energy flowing throughout your body.

By consciously altering posture, it is possible to affect underlying problems. The Qi can be made to flow more or less to specific areas. **Healthy, neutral posture improves the function of internal organs and helps harmonize the nervous system by reducing chronic muscle tension, lowering overall stress, and decreasing tension throughout the body.[3]** The reduction of pain and sensory motor activity improves the function of the nervous system.[3] **Correct posture delays many musculoskeletal degenerative disorders resulting from chronic overuse and inappropriate biomechanical relationships of the joints.[3]** This adds years of positive health to a person's life.[3]

The following principles significantly reduce our risk of injury:[1]

1. All work activities should permit the worker to adopt several different, but equally healthy and safe, postures.
2. Where muscular force has to be exerted, it should be done by the largest appropriate muscle groups available.
3. Work activities should be performed with the joints at about mid-point of their range of motion. This applies particularly to the head, trunk, and upper limbs.

Don't forget that posture is very important during ALL activities of daily living such as walking, lifting, holding the telephone, and driving.[2] Avoid restricting movements, clenching muscles, and adopting an unnaturally stiff posture.[2]

Posture is just one of the principles of healthy energy and flow of Qi in the body. The other principles are movement, proper breathing, relaxation, and concentration.[3]

Exercise for conditioning

Regular exercise such as swimming, walking, or bicycling helps the body stay aerobically conditioned. Specific strengthening exercises help the muscles surrounding the back to stay strong. Trunk strength is important to help support the upper body and maintain good posture.[2] It is best if back muscles are 30% stronger than the abdominal muscles.[2] Exercise and a bit of strengthening promotes good posture that conditions muscles and prevents injury.[2]

Movement

In order to maintain a relaxed yet supported posture, change positions frequently.[2] Getting up every half-hour to take a break from sitting will minimize the development of muscle tension. The element of movement is easy to incorporate by taking frequent stretch breaks and by using the rocking feature available on most appropriate chairs. Just flip that rocking lever up and rock slightly while you work! And don't forget to drink plenty of water so you can resist the temptation to sit too long.

For people who already have some back pain, it is a natural reaction to try to limit movement to avoid pain. However, the structures of the back were designed for movement. Unless there is a fracture or other serious problem, motion is important. Restricting movement results in a downward cycle of limited range of motion and more pain.[2]

Self-observation and awareness

The big hurdle to achieving good posture is that people are not skilled observers of their own joint and muscle functioning.[1] Without special training, people do not know what

healthy postures are and, therefore, are not able to correct their harmful posture. One training program that cultivates these skills is the Alexander Technique. It shows people how they are misusing their bodies. Alexander Technique also teaches people how to avoid every day habits that create excessive amounts of static work and unnecessary muscular force. By learning to observe themselves in a new way and being more aware of routine activities, people experience physical changes that improve comfort while performing everyday tasks.[1] No exercises are required, just a shift in awareness.

Appropriate footwear

Avoid wearing high-heeled shoes that affect the body's center of gravity and changes the alignment of the entire body, back support and posture.[2] When standing or walking for long periods of time on or off the job, wear supportive footwear. Use anti-fatigue mats or insoles[2] such as those recommended on the Lab Supplies Products web: *http://working-well.org/plabsup.html.*

REFERENCES:

1. "Applying Ergonomic Principles in the Workplace: How the Alexander Technique can Help", by Holly A. Sweeney, M.A. http://www.alexandertechnique.com/ergonomics.htm
2. *Ten tips for improving posture and ergonomics*. By Kelly Andrews, D.C. June 7, 2004 ©1999-2007 Spine-health.com http://www.spine-health.com/topics/conserv/posterg/posture01.html
3. *Active Principles of Qi Gong*. Taoist Sanctuary of San Diego. 4229 Park Blvd., San Diego, CA 92103. http://www.taoistsanctuary.org/pages/qigong/principles.html
4. *Slouching a real back-breaker*. ©2004-2007 Health24.com http://www.health24.com/Man/Medical/748-766,33230.asp
5. A Compressive Cervical Myelopathy Due to Sirsasana, A Yoga Posture: A Case Report. By Sethi, P.K., Batra, A., M.D., Sethi, N.K., M.D., Torgovnik, J., M.D., and Tortolani, E. The Internet Journal of Neurology. 2007, Vol. 6, No. 1. http://www.ispub.com/ostia/index.php?xmlFilePath=journals/ijn/vol6n1/yoga.xml
6. "Aching Back? Sitting Up Straight Could Be the Culprit." Radiological Society of North America. Press Release. November 27, 2006. Torio, T., M.D., Pope, M. Ph.D., Takahashi, K., M.D., Smith, F.W., M.D. http://www2.rsna.org/pr/target.cfm?ID=294
7. "Are cross legged sitting postures beneficial or harmful?" Ergoweb Forum response by "Sarah MNZSP (Member New Zealand Society of Physiotherapists). Feb. 27, 2007. http://forum.ergoweb.com/cgi-bin/forum/gforum.cgi?post=4176;sb=post_latest_reply;so=ASC;forum_view=forum_view_collapsed;guest=1252913