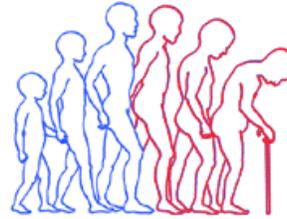


Posture and Body Alignment for Health



By Tamara Mitchell

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 and equipment, bad posture often occurs. And, after all, posture matters 25/7, not just at work. Think about how you sit on your couch or in your car. Bad posture is often 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.

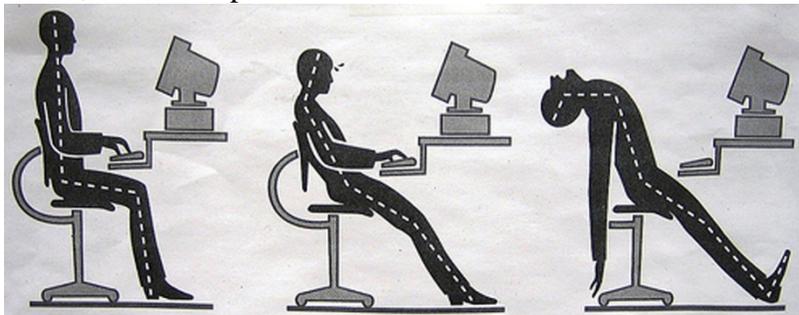


Illustration courtesy of flickr.com. Joe Loong

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} Good posture is important all the time, not just at work, but while you’re driving, walking, participating in your favorite sport, and even while you’re sleeping.

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

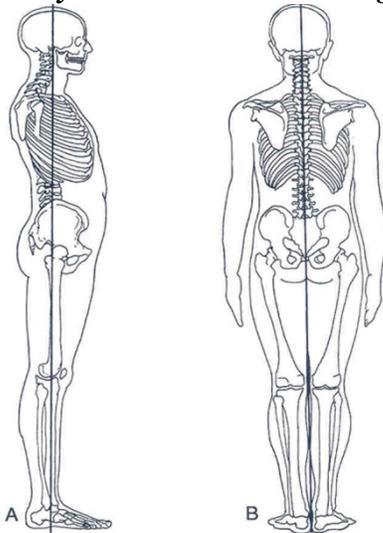
Posture involves not just the alignment of the spine and torso, but the position of all the body parts: the head, neck, shoulders, arms, legs, and feet.

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. Neck pain is very often due to forward head and neck posture causing undue stress on the vertebrae of the lower neck, increased tension in the upper back and shoulders and possible development of degenerative disc disease.⁷

There is a degree of tolerance in the body with regard to posture. Deviations from perfect posture can still allow the body to perform its necessary functions with ease, but extremely bent or twisted postures as well as unnecessarily rigid or straight postures interfere with the energy flow throughout the body and internal organs and if these postures are held static for a prolonged time, they lead to muscle tension, permanent misalignments, and buildup of scarred fascial tissue surrounding the muscles.^{3,8} It is important to become aware of what correct posture feels like and to make small corrections throughout the day to bring yourself back to that position.⁹

Awkward postures increase gravitational forces that pull on your neck and spine. Not only are you stressing the fragile bone structures of your spine and associated ligaments, but also the muscles must act like guywires to hold your body in these positions. Resulting muscle tension and fatigue is the cause of a great deal of pain for many people. Over the years, awkward posture increases the strength of the muscles which pull you out of alignment and weaken the muscles which hold you upright, so that a slumped posture with rounded shoulders, hollow chest, and drooping head feels more and more natural to you. Not only that, but internal organs are often compressed, interfering with their necessary functioning.

Healthy Posture While Standing



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 passes through most of the cervical (neck) vertebrae and the vertebrae in the lumbar (lower back).⁵ The position of the hips, pelvis, trunk, and lower limbs are critical to upright human posture.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

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 position of the spine directly affects the relationship and functioning of the internal organs.^{3,10}

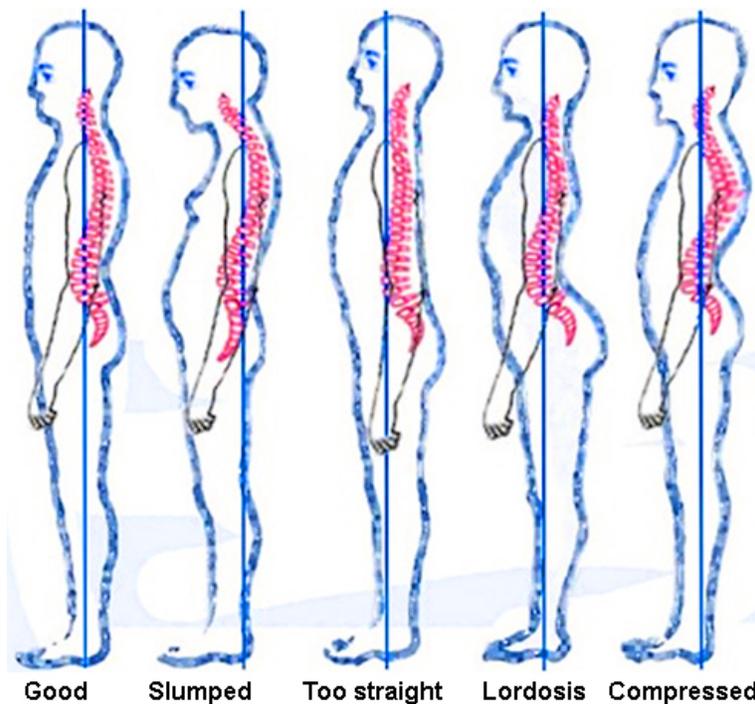


Illustration courtesy of Reference 9

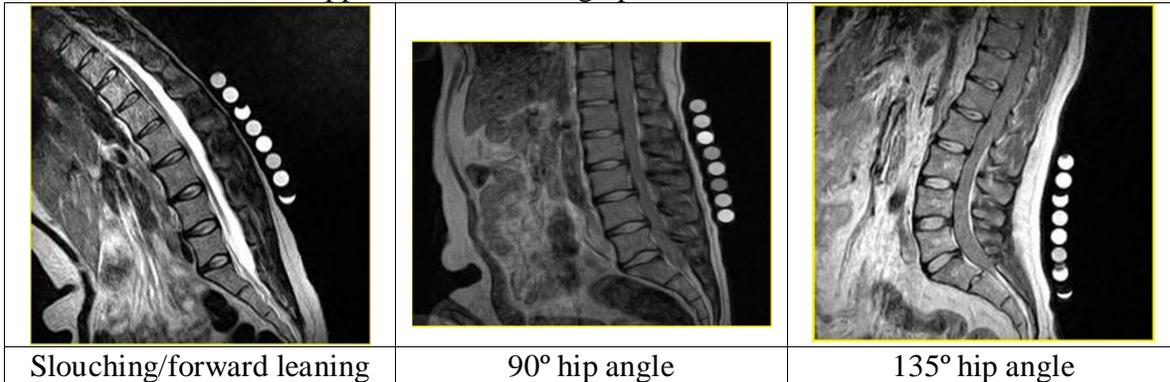
Eastern Wisdom

The spine provides the flow of Qi (energy) into the internal organs from the rear of the body.³ 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 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.**^{3,10} The reduction of pain and sensory motor activity improves the function of the nervous system.³ **Correct posture prevents or 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 At first, correct posture may not feel right and may even be tiring, but will become natural quickly, especially if exercises are done to increase strength of the muscles between the shoulder blades.¹¹

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

Healthy Posture while Seated. A small study of 22 healthy volunteers with no history of back pain or surgery determined, through the use of MRIs, that a 135° angle between the body and thighs *may* be the best position, which differs from the 90° posture that is most often illustrated in “proper posture” examples.⁶ Other experts and research support a greater than 90° angle to release stress on the lower back, but dispute the 135° angle as being too great and especially question that reclining the seat back, which is the method used in the original research, is the best way to achieve a wider seat angle since that adds strain to the neck (cervical spine) by requiring the head to be held upright unsupported and the arms must be supported and reaching up and out to function.¹²



Illustrations courtesy of Reference 12

The slouch position (less than 70°) 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 135° posture showed the least disk movement.⁶ The 135° angle may or may not prove to be the exact proper angle to reduce spinal stress, but the stresses placed on the neck resulting from a reclining posture may be significant! A better way to achieve a wider hip angle is by lowering the legs rather than reclining the back, leaving the torso upright in a better position to function.

Did you know that your head weighs 10-18 pounds? As much as a bowling ball! A neutral posture where the head is aligned with the hips, while sitting, standing, or walking, means that this bowling ball (your head) is perfectly balanced on top of your neck. Each inch that you tilt your head away from this perfect balance adds approximately 10 pounds to the load of your head, due to gravity. In addition, extending your arms adds to the load. So if you are in a slumped position with your arms extended, the load on your body can add up to 150 pounds! If you think you are more relaxed when you are slumping, think again. Your body is working overtime. No wonder you end up with tight shoulder, neck, and back muscles!



One study looked at three different postures to investigate the impact on muscle activity in the neck. The three postures were slumped with a rounded back and upright head, an upright posture with forward tilted pelvis and upright head to create natural curvature in the lower spine, and a third posture with shoulders and head moved back slightly, somewhat less forward tilt to the pelvis, but still a natural curve to the lower spine and upright head.¹³ The muscle activity in the neck muscles was significantly less for the third condition where the neck and shoulders were less rounded.¹³ This study did not

investigate the effect of opening the hip angle on the neck, but it does show that the placement of the head and neck are very important in considering a good seated posture and that a posture which vertically aligns the head upright above the shoulders is critical to reducing muscle fatigue in the neck.

Ergonomists have generally encouraged sitting with a hip angle between 90° and 120°, asking clients to sit high enough so the hips are slightly higher than the knees.^{12,15} In addition, sitting completely stationary is not healthy. A dynamic spine and changing posture is very important.^{12, 15}

In fact, the task you are engaged in has a lot to do with what your sitting posture needs to be. The 90° -120° angle is appropriate for working at a computer, but reading or writing requires a forward tilt of the torso, so the chair should tilt forward 5° to 15°.¹⁵ Children often naturally tilt a chair forward onto the front legs to relieve back pressure as shown below.¹⁴ Playing a musical instrument requires a different posture depending upon the instrument.¹⁵



Illustration courtesy of Reference 14

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 prevent 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. Not only is hydration important for overall health, frequent bathroom breaks will mean that you walk!

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, more muscle tension, and more pain.²

Appropriate footwear

Avoid wearing high-heeled shoes that affect the body's center of gravity and change 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 insoles² such as those recommended on the Lab Supplies Products page of this website: <http://www.working-well.org/Website/plabsup.html>.

Getting Back to Neutral Posture

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.

Techniques that teach "neutral" postures to enable people to live without the stress caused by muscle tension have been developed over the past 100 years. People learn to move, walk, and sit in a new way so that gravitational forces on their body are minimized. The effort to simply "exist" is greatly reduced so that you feel lighter and more energetic, and the sources of pain from misalignment are reduced or eliminated. Here are few of the many possible ways to "unlearn" those bad habits and get back in touch with your body.

Alexander Technique proposes that injury, illness, and mental, physical, or emotional bad habits disrupt the appropriate flow of information between your mind and muscles. It is possible to restore an optimal connection between body and mind through gentle non-manipulative touch and verbal instruction.^{16,17} Alexander Technique 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.^{1,16,17} No exercises are required, just a shift in awareness which results in a big reduction in the muscular effort needed to support the skeleton, to move, and to perform activities of all types.^{16,17}

Alexander Technique presents movement and posture from a teacher/student approach rather than a patient/therapist approach.¹⁸ Alexander Technique utilizes controlled movement, while Feldenkrais, described next, utilizes spontaneous movement.¹⁸

Feldenkrais uses gentle movement and directed attention to develop a broader awareness and self-image through movement sequences so that the individual pays attention to parts of the self that have been out of their focus.¹⁹ The individual uses trial and error to determine the most comfortable and functional postures and movements.^{Livestrong} Feldenkrais is taught either via "Awareness Through Movement" or "Functional Integration", the latter involves touch to facilitate movement and awareness.¹⁸ Students in the classes become aware of neuromuscular patterns, rigidities, and expand new methods of movement, enabling life to be fuller, more efficient, and comfortable.¹⁹ Feldenkrais, as the Alexander Technique, uses a student/teacher approach to posture and movement correction.¹⁸

Balance starts with an affectionate attitude toward the body and merges this with anatomical information about body movements centered from the pelvis, and it embraces a flowing connection between body, mind, and soul.²⁰ Through movement, the individual

becomes aware of the body's alignment, avoiding injury and unnecessary tensions or stresses.²¹ Balance is not a series of poses or exercises.

QiGong and Tai Chi are series of exercises or physical postures, breathing techniques, and mental focus that can increase energy (qi) or affect the flow of energy, to cleanse or heal the body, reduce stress, build stamina, increase vitality, and enhance the immune system.^{3,22,23} QiGong and Tai Chi go beyond most other therapies by invoking the power of the mind and connecting with the spirit to encourage a positive outlook on life, eliminate harmful attitudes and behaviors, and bring more harmony, stability, and enjoyment to life.²² Most importantly, it reestablishes the mind/body/soul connection and it has proven scientific use in improving cardiovascular, respiratory, circulatory, lymphatic, and digestive functions.²² It is believed that the body knows what correct posture is and by following certain exercises and movements, we can release tense habits and return to a natural posture through regular, long-term practice and attention.⁸

Trager Work is based on the premise that discomfort, pain, and reduced functionality are physical symptoms of accumulated tension resulting from accidents, weak posture, fear, emotional blockages, and daily stress. There are two aspects of Trager Work: table work where a practitioner gently rocks and lengthens the client's body to release tension, and Mentastics which involve movement lessons for continued self-care.²⁴

Posture Therapy is an individualized, integrated approach to correcting posture problems. Following an initial postural assessment, it may incorporate isolated stretching exercises, myofascial release, therapeutic exercise, and movement re-education.^{25,26}

To find practitioners of these techniques, refer to the websites in the Resources section at the end of this article.

Conclusions:

- Use seating that encourages active postures that change frequently. Movement is healthy for your spine and muscles, yet many people have a tendency to limit movement and sit stiffly, unnecessarily increasing the amount of tension in the body, especially the back and neck.^{1,10,27}
- Postures which distort the natural S-curve of the spine for extended periods are quite damaging and should be avoided.
- If you find yourself slouching, determine the reason. Is it a habit? Are you having trouble seeing clearly at the distance you are viewing your work? Perhaps you need glasses. Are work surfaces, monitor, and chair adjusted to the right heights for you? Or is your body fatigued from sitting at a 90° angle for too many hours?
- If you use a traditional office chair, raise the chair and tilt the seat forward with the backrest remaining vertical or slightly reclined to open your hip angle. You should not tilt the chair so far forward that you find yourself sliding and you should make sure that your feet are flat on the floor. This may require an adjustment to the seat height and associated heights of other accessories to enable a relaxed posture and the ability to look forward with the head without hunching down or tilting the head back.

- Consider alternative seating that encourages a more open hip angle such as a kneeling chair, or fitness ball. Gradually increase the time alternative seating is used, using a traditional chair when back muscles become fatigued.

	
<p style="text-align: center;">Varier Thatsit Balans Kneeling chair</p> <p>http://www.varierfurniture.us/Products/Prevent/Thatsit-balans-R</p>	<p style="text-align: center;">Fitness ball</p> <p>Illustration courtesy of http://www.gearfire.net/10-reasons-to-use-an-exercise-ball-as-your-chair/</p>

- Consider using a sit/stand table to reduce the number of hours of sitting required...and then remember to use it!
- Don't forget to pay attention to your posture while you're driving. Please refer to our article on driving ergonomics to make necessary adjustments to your automobile.²⁸
- Seek guidance from one of the many types of posture techniques available. Find one or more that appeals to you and make it a part of your life.
- The musculature of the body should be strong and balanced equally on both sides of the body to provide support to the skeleton. Imbalances in strength can cause the whole skeleton to be asymmetrical. Weakening of the muscles is often a result of age, excess weight, or simply a habit of slumping.
- Where muscular force has to be exerted, it should be done by the largest appropriate muscle groups available.
- 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.

RESOURCES:

Alexander Technique, information, find a teacher:

- <http://www.alexandertechnique.com/at.htm>
- <http://www.amsatonline.org/>

Feldenkrais

- The Feldenkrais Method of Somatic Education, <http://www.feldenkrais.com/>

Qigong

- National Qigong Association, <http://nqa.org/>
- Qi Energy Exercises, <http://www.qienergyexercises.com/>
- American Tai Chi and Qigong Association, <http://www.americantaichi.org/>
- TaiChi Basics, <http://taichibasics.com/choosing-a-tai-chi-class/>

Trager

- United States Trager Association, <http://tragerus.org/>

Posture Therapy

- <http://www.posturetherapy.us/Posture-Therapy.html>

Balance

- The Balance Center, <http://www.balancecenter.com/index.htm>
- Kentro Body Balance, <http://www.kentrobodybalance.com/index.shtml>

This article and all of our articles are intended for your information and education. We are not experts in the diagnosis and treatment of specific medical or mental problems. When dealing with a severe problem, please consult your healthcare or mental health professional and research the alternatives available for your particular diagnosis prior to embarking on a treatment plan. You are ultimately responsible for your health and treatment!

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://taoistsanctuary.org/qi-gong-taoist-meditation/principles-of-qi-gong/>
4. *Slouching a real back-breaker*. ©2004-2007 Health24.com
<http://www.health24.com/Man/Medical/748-766,33230.asp>
5. *Equilibrium of the Human Body and the Gravity Line: The Basics*. LeHuec, J.C., Saddiki, R., Franke, J., Rigal, J., and Aunoble, S. European Spine Journal. Sept. 2011, 20(Suppl. 5): 558-563.
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3175916/>
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. *How Poor Posture Causes Neck Pain*. Morrison, G. 3/7/2011. ©1999-2014 Spine-health.com. <http://www.spine-health.com/conditions/neck-pain/how-poor-posture-causes-neck-pain>
8. *Qi Posture Exercises*. Stenudd, S., <http://www.qienergyexercises.com/qi-posture.htm>
9. *Tired of Lower Back Pain?* Foreman, L., Active Balance: Fitness & Rehabilitation. March 31, 2011. <http://www.lyndaforeman.com/tired-of-lower-back-pain.html>
10. *The Basics of Good Posture* Adams, C., ©2014 About.com
http://ergonomics.about.com/od/Posture/a/Basics_of_Good_Posture.htm
11. *Office Chair, Posture, and Driving Ergonomics*. Triano, J.J., and Selby, N.C. 9/26/2006. ©1999-2014 Spine-health.com. <http://www.spine-health.com/wellness/ergonomics/office-chair-posture-and-driving-ergonomics>

12. *Relieving Spinal Stress: Discovering the Optimal Seated Posture for the Stress-Free Spine.* Working Ergonomics, March 1, 2011. Berube, J.,
<https://workingergonomics.wordpress.com/2011/03/01/relieving-stress/>
13. *The influence of different sitting postures on head/neck posture and muscle activity.* Caniero, J.P., O'Sullivan, P., Burnett, A., Barach, A., O'Neil, D., Tveit, O., and Olafsdottir, K. *Manual Therapy*, Feb. 2010, Vol. 15 (1), 54-60.
<http://www.sciencedirect.com/science/article/pii/S1356689X09001052>
14. *Best Way to Sit: Tilt the Seat Forward (Sitting Postures).* Mandal, A.C.
<http://www.bodyzone.com/site/body-lifehabits/best-way-to-sit-tilt-the-seat-forward-sitting-postures.html>
15. *The Elements of A Good Sitting Posture.* Adams, C. ©2014, About.com.
<http://ergonomics.about.com/od/Posture/a/Sitting-Posture.htm>
16. *Frequently Asked Questions.* ©2014 American Society for the Alexander Technique.
<http://www.amsatonline.org/faq>
17. *What is the Alexander Technique? What are the Benefits of Classes? The Complete Guide to the Alexander Technique.* <http://www.alexandertechnique.com/at.htm>
18. *Alexander Technique and Feldenkrais Method: A Critical Overview.* Jain, S., Janssen, K., DeCelle, S. *Physical Medicine and Rehabilitation Clinics of North America.* 15(2004) 811-825.
http://www.med.nyu.edu/pmr/residency/resources/PMR%20clinics%20NA/PMR%20clinics%20NA_sports%20med/alexander%20and%20feldenkrais_PMR%20clinics.pdf
19. *Frequently Asked Questions: The Feldenkrais Method of Somatic Education.* The Feldenkrais Educational Foundation of North America and The Feldenkrais Guild of North America. http://www.feldenkrais.com/method/frequently_asked_questions/
20. *KENTRO Body Balance: Frequently Asked Questions.* Thusius, A. ©2011 Angelika Thusius. <http://www.kentrobobybalance.com/method/faq.shtml>
21. *Balance Center: Balance Practice.* ©2001-2014 Balance Center.
<http://www.balancecenter.com/yoga.htm>
22. *What is Qigong?* The National Qigong Association. <http://nqa.org/resources/what-is-qigong/>
23. *Tai Chi for Posture and Back Pain.* Humphreys, R. 2/19/2004. ©1999-2014 Spine-health.com. <http://www.spine-health.com/wellness/yoga-pilates-tai-chi/tai-chi-posture-and-back-pain>
24. *The Trager Approach.* United States Trager Association. <http://tragerus.org/>
25. *Posture Therapy.* Pain Relief Treatment Center, LLC.
<http://www.posturetherapy.us/Posture-Therapy.html>
26. *Posture Therapy.* Mercer, L. Jan. 28, 2014. ©2014 Demand Media, Inc.
<http://www.livestrong.com/article/183967-posture-therapy/>
27. *Ten Tips for Improving Posture and Ergonomics.* Andrews, K., Dec. 4, 2013. ©1999-2014 Spine-health.com. <http://www.spine-health.com/wellness/ergonomics/ten-tips-improving-posture-and-ergonomics>
28. *AutoErgonomics – Driving & Ergonomics.* Mitchell, T. ©2014 Working-Well.org,
http://www.working-well.org/articles/pdf/Auto%20Ergonomics_2013.pdf

Revised 5/16/2014