

Building Functional Fitness

You can design a more targeted program once you've analyzed your client's posture.

There has been a recent resurgence in recognizing the importance of postural/structural alignment—and it's not a moment too soon. We need to treat the human body as a highly integrated structure instead of a series of independent parts. There are biomechanical connections in the body that reach beyond the muscle group(s) you target with a particular exercise.

Postural and structural changes occur over time. Certain muscles can become shorter and tighter; others can become longer and weaker. These changes can alter the muscles' mechanical lines of pull, causing other muscles and muscle groups to compensate. The postural changes then begin to directly alter joint mechanics. This alteration (or compensation) leads to a decrease in performance. If mechanical changes are allowed to continue, the body will exhaust its ability to compensate for them. Problems can result, including—but not limited to—inflammatory responses to overstressed tendons and bursa, noncongruent joint surfaces, unequal loading of the intervertebral disks, nerve impingements, ligament laxity, muscle spasms and ischemia.

One of the most effective ways to evaluate the body's mechanical connections is to assess your client's standing posture. Standing posture is a gauge of muscle balance, mechanical efficiency, kinesthetic sense and neuromuscular coordination. Following the assessment, you can incorporate the postural evaluation into your exercise prescription. The strength training exercises you choose can have a dramatic impact on your client's long-term structural health. Disregarding structural problems and muscle imbalances when developing a strength training program can reinforce existing problems, predispose your client to injury or exacerbate an existing injury or symptom. On the other hand, functional exercises, examples of which are shown here, can help clients work on postural issues.

To effectively conduct a postural evaluation and apply it to programming, you will need a thorough knowledge of kinesiology and, at a minimum, a working knowledge of biomechanics. Clients who have significant or chronic postural deviations and/or pain, a history of spinal problems, or radiating nerve pain to the upper or lower extremities should be referred to a qualified health professional.

Evaluating Posture

Conduct the postural evaluation in an environment that allows the client to be as relaxed as possible. Obstacles to your client's ability to relax might include cold temperatures, loud music and uninvited observers. Ideally, if there is enough privacy, a male client would wear only shorts, and a female client would wear only shorts and a jogging bra. The client should stand barefoot or with socks on—never with shoes on. It is imperative the client does not "pose."

When conducting the evaluation, you can use a grid attached to the wall, as shown in the illustrations on page 24. A plumb line can be helpful. At Function First, we record the evaluation in writing. While Polaroid photos are an excellent tool, the film is expensive and the photos don't always show enough detail. If you use these, take notes, too.

In addition to comparing your client's posture to the ideal structural alignment evaluation described on the following pages, note any overdevelopment (hypertrophy) of one area of the body, compared to the same area on the opposite side. →

When the body is at rest, it's useful to look for bilateral symmetry.

When evaluating posture and structural alignment, you are essentially viewing the body from three planes: sagittal, frontal and transverse (horizontal). More specifically, you are looking at the axes (lines) within these planes and the relation of the body's segments to them. Look for posture that deviates from appropriate positioning along the axis in which each segment moves. These observations can provide a wealth of insight into the dos and don'ts of your client's strength training program.

"Ideal" posture is described below. Note how your client's body differs from the ideal. Quantify these postural deviations, using terms such as "slight," "moderate" and "excessive" so you can compare notes for future reevaluations.

Front View. With ideal posture, the body appears divided into two equal

halves. The head sits evenly between the shoulders and the ears are level. The head is not rotated. An imaginary line runs from the tip of the nose through the sternum, through the pubis symphysis, and falls equidistant between the two feet. The shoulders are level, with the arms relaxed at the side. Each arm is equidistant from the waist. The clavicles are level. Note the angle of the elbow (normal is from 5° to 15° of flexion). The palms of both hands are facing the body.

The iliac crests are level with each other. The anterior superior iliac spines (ASIS) are also level. The patellae point straight ahead and are level. The feet point straight ahead or toe slightly out (to a maximum of 10°). The medial and lateral malleoli are level with each other. Of utmost importance is that the axes of the load-bearing joints of the hip, knee and ankle are vertically

aligned. This alignment ensures that the downward force of the body due to gravity is equally distributed and dissipated.

Lateral View. Remember to view both sides of the body so you can compare the right and left sides. In ideal posture, the mastoid process sits directly over the shoulder. The spine has a slight concave curve in the cervical region, a slight convex curve in the thoracic region, and a slight concave curve in the lumbar region. The shoulder aligns vertically over the hip joint, the hip joint over the knee and the knee over the ankle.

Observe the spine in relationship to the sacrum. The position of the scapula may create the appearance of a kyphosis (rounding of the upper back), or a large buttocks may create the appearance of a hyperlordosis, even if one is not present.

From a mechanical perspective, the position of the pelvis is most influential.

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Changes in the position of the pelvis along any one of the three primary axes can potentially affect structures above and below it.

To determine the rotation of the pelvis anteriorly to posteriorly, the ASIS and posterior superior iliac spine (PSIS) can be palpated simultaneously. The ASIS and PSIS should be in the same horizontal plane, and the ASIS and pubis symphysis should be in the same vertical plane. This relationship is the sign of a neutral pelvis. A higher PSIS indicates an anterior tilted pelvis, which increases lumbar lordosis. A lower PSIS indicates a posterior tilted pelvis, which decreases lumbar lordosis. An increase or decrease in the lordotic curve of the lumbar spine can affect the position of the thoracic and cervical spines.

The knees should be at no more than zero to five degrees of flexion.

Rear View. When viewing the client from the back, double-check your observations from the front view. In addition, observe the position of the scapulae. In perfect posture, the medial borders are parallel to the spine, and the inferior angles are level with each other.

The posterior view allows you to view the spine and note any lateral curvature. The gluteal folds should be level. The Achilles tendon should drop straight to the floor. Angling out could indicate overpronation, and angling in could indicate oversupination. Weight should be evenly distributed between the two feet and along the metatarsal heads and heels.

Applying Postural Evaluation to Strength Training

By performing a postural/structural evaluation, taking a thorough health history and exploring your client's goals, you can obtain the information necessary to select the exercises for the strength training portion of the exercise program.

The client's posture is the "snapshot" of his or her muscle imbalances. By applying your knowledge of kinesiology,

you can use the three basic principles below to help create a strengthening program that will work toward greater overall musculoskeletal balance and function.

1. Remember that no muscle works alone; the body operates as an interdependent unit. Instead of isolating muscle groups, try placing your clients in positions/postures that require the weaker muscle groups to stabilize the movement. This can improve the strength of these muscles and their synergy with other muscle groups. This is true even when you are working the muscle groups that have become shorter and tighter.
2. Place a greater emphasis on strengthening the muscle groups that have become longer and weaker. Determine the axis each body segment moves along. If a segment is out of alignment, which muscle groups work along the same axis in the opposite direction? Strengthening these groups can help bring that segment back into alignment.
3. Complement your strengthening of the long/weak muscles with stretching of the short/tight muscles.

Changing posture is a process of changing previously learned motor programs in the body. It is not something that can be cognitively controlled on a consistent basis. The body must be reeducated to function as it was designed to do. And that will only happen by consistent application of the right tools for the right job.

Anthony Carey, MA, CSCS, earned his master's degree in biomechanics. He is vice president of development and training for Function First Inc., headquartered in Del Mar, California (800-211-1952, or e-mail Fncion1st@aol.com).

Evaluation Case Study

The following case study of a client with typical posture provides an example of how you can apply postural evaluation to exercise programming. The client is a 32-year-old recreational athlete who works in an administrative position, seated in front of a computer throughout the day. She wants to begin a strength training program and is generally in good health.

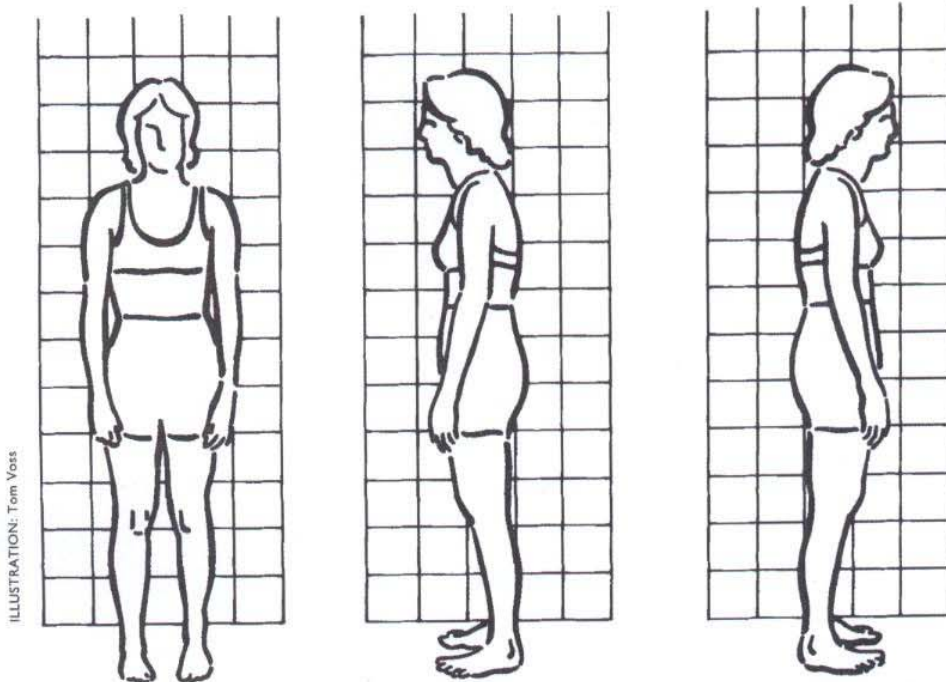


ILLUSTRATION: Tom Voss

Evaluation Findings:

- head protruding forward (moderate)
- knees hyperextended (slight)
- upper back in flexion (moderate)
- shoulders rounded (slight to moderate)
- axis of the hip joint displaced forward, when viewed from the side (excessive)
- pelvic rotation neutral
- femurs rotated internally (moderate)
- Achilles angled outward (slight)
- lumbar lordosis (moderate) due to anterior displacement of the hip joint

Note: Rear view not shown.

Program Don'ts

Don't overemphasize chest and anterior shoulder work.

Why? Relative to this client's posterior musculature, the anterior torso muscles will be tighter and stronger. Overworking these muscle groups could promote greater thoracic flexion and internal rotation at the glenohumeral joint.

Don't design your program totally around weight machines. Include free weights as much as possible.

From a structural standpoint, this client needs to significantly strengthen her postural/stabilizing musculature. The ability to do this is greatly reduced while relying on the guidance and support of machine pulleys and apparatus.

Program Dos

Do specifically strengthen the iliopsoas muscles and the secondary hip flexors.

Why? The iliopsoas muscles are probably the most influential postural muscles in the body. This client has weak hip flexors, thus an anterior displacement of the pelvis (the equivalent of relative hip extension). With the hips forward, the thoracic back increases in flexion to maintain the body's center of gravity over its base of support—the feet.

Do strengthen the thoracic extensors (erector spinae, paraspinals) and scapular stabilizers (rhomboids, middle and lower trapezius).

The thoracic extensors and scapular stabilizers require strengthening, even

though the thoracic flexion (kyphosis) is a secondary change related to the weak hip flexors. Associated with thoracic flexion is scapular abduction. This, along with the forward head position, compensates for the posterior displacement of the torso in the thoracic region—to maintain the body's center of gravity over the base of support. If one segment “zigs,” another must “zag.”

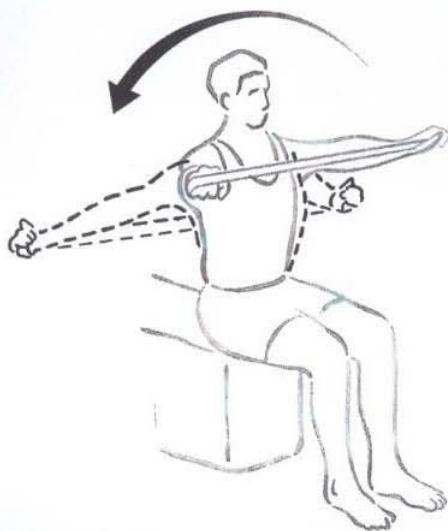
Do remember that postural changes occur over time.

See Functional Exercises on page 26.

Functional Exercises

The functional demand exercises described here are designed to address the interdependency of the structural weaknesses. As you will see, the exercises require using the whole body rather than isolating segments or quadrants of the body.

These exercises can be an adjunct to your strength training program. You can use them at the beginning of the exercise session as a warm-up. Clients can also do them on the days they don't do strength workouts.



SITTING SHOULDER ROTATIONS

Muscles Worked: iliopsoas, quadratus lumborum, lumbar and thoracic extensors, rhomboids, trapezius, levator scapulae, serratus anterior, rotator cuff, pectoralis minor, deltoids and triceps

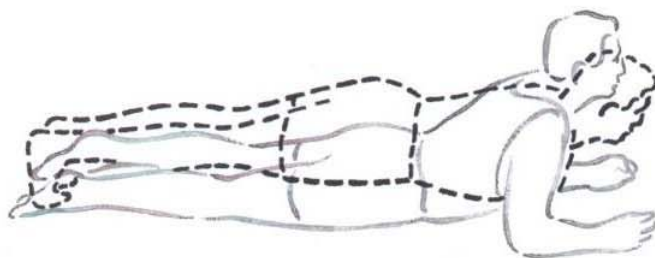
Starting Position: Sit on a firm surface so the knees and hips are flexed to 90 degrees. Actively rotate the pelvis anteriorly to sit on the ischial tuberosities.

Action: Hold a strap or belt (not a rigid stick) in front of the chest with arms parallel to the floor. Hold the strap with the palms down, elbows extended and arms at approximately a 45 degree angle from the body. (Note: The difficulty of this exercise is increased by moving the hands closer together and decreased by moving the hands farther apart.) Throughout the exercise, keep the strap taut by applying a

constant outward pressure. Elbow joints are held in extension.

Maintaining the proper positioning, slightly rotate the strap overhead and then behind the head by a combination of flexion and external rotation at the shoulder joint. The end position should find the forearm supinated with the palm to the ceiling. Reverse the direction and repeat.

Sets and Reps: 3 sets of 10 reps



HANGING COBRA

Muscles Worked: quadriceps, hip flexors, abdominals, lumbar erectors, shoulder girdle stabilizers

Starting Position: Lie prone on the floor, resting on the elbows and forearms. The elbows are positioned directly under the shoulder joint and the palms of the hands face each other in a loose fist.

Action: Line up the feet, hip width apart, and tuck the pads of the toes into the floor. Lift the body between the toes and shoulders off the ground, so a straight line can be drawn along the body from the ankle joint to the shoulder joint. Once the body is elevated, contract the quadriceps and abdominals for stabilization, then relax between the scapulae to allow them to passively retract. Focus the eyes straight ahead. Hold the position for 10 to 15 seconds.

Sets and Reps: 1 set of 3 reps

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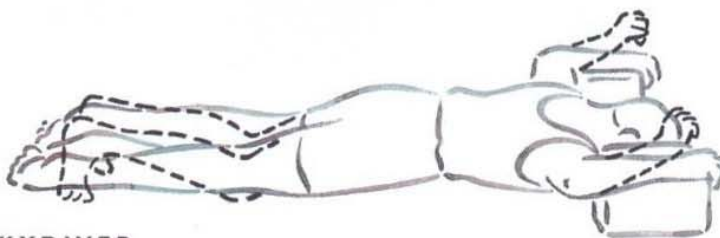
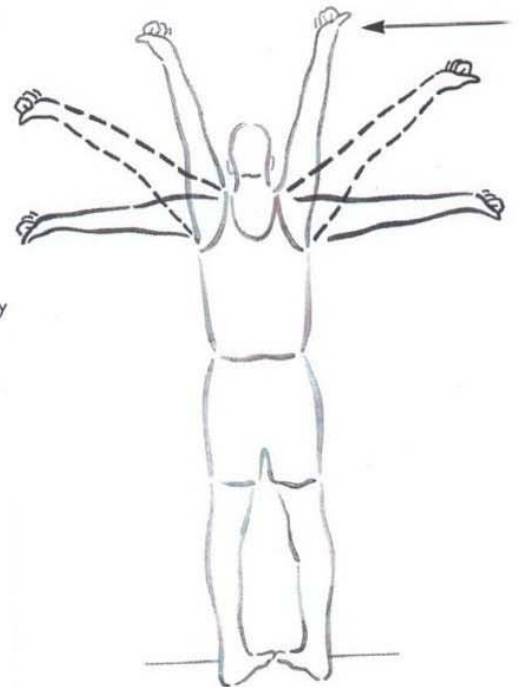
WALL CLOCK

Muscles Worked: iliopsoas, quadriceps, thoracic extensors, trapezius, rhomboids, levator scapulae, deltoids, teres minor, infraspinatus, supraspinatus, triceps

Starting Position: Stand facing a wall that the toes and forehead can touch. The feet are pigeon-toed, and the quadriceps are contracted.

Action: Place the arms on the wall overhead with the elbows extended and the hands in loose fists. By externally rotating at the shoulder, move the thumbs on both hands until they point away from the wall. From this position, lower the arms to 90 degrees of shoulder abduction while maintaining contact with the wall, external rotation at the shoulder joint and extension at the elbow. Once the arms have reached 90 degrees, reverse the process and move the arms back overhead.

Sets and Reps: 3 sets of 12-15 reps



SKYDIVER

Muscles Worked: hip flexors, lumbar and thoracic erector spinae and paraspinals, lower trapezius, rhomboids, infraspinatus, teres minor, posterior deltoids

Starting Position: Lie prone with the legs straight, arms out to the sides at shoulder level and elbows flexed to 90 degrees. The forearm is supported by books or pillows approximately 6 inches off the floor, palms down.

Action: Tuck the pads of the toes into the floor, then draw the knees slightly toward the pelvis, causing the hips to flex and the pelvis to rotate anteriorly. From this position, rotate the forearms off the books by externally rotating at the shoulder joints. Elbows remain on the books. Hold for one count, then lower the arms and repeat.

Sets and Reps: 3 sets of 10 reps



SITTING TO STANDING

Muscles Worked: quadriceps, hamstrings, gluteus maximus, iliopsoas, erector spinae, middle trapezius and rhomboids

Starting Position: Sit toward the front of a sturdy chair that allows the hip and knee joints to be flexed to approximately 90 degrees. The ankle joint is directly under the knee joint, and the feet point straight ahead. The pelvis is actively tilted anteriorly. The fingers are interlocked behind the head, and the elbows are held back in line with the torso (the frontal plane). A firm pillow is held between the knees.

Action: Stand without moving the feet on the ground and keep the extensors of the spine engaged. Try to limit the amount of forward lean of the upper body. Return to the sitting position while actively maintaining spinal extension.

Sets and Reps: 3 sets of 10-15 reps