Proper Biomechanics for Improved Running Economy/Efficiency

Although we are all constructed very similarly—with the same bones, muscles, etc.—slight variances in such things as body type, muscle attachment locations, and flexibility can make each person's running form unique. Hence, there is no one *perfect* way to run. While there are usually a few areas in which most runners can improve, sometimes what seems like poor form cannot be corrected, due to that individual's unique, genetic, biomechanical situation, without causing further inefficiencies*.

Below are a few suggestions to help you improve your running form to create better running economy or efficiency. A more efficient runner uses less oxygen and energy to run at the same pace and is thus more economical—or can go farther or faster on the same amount of energy and oxygen.

The entire body needs to be at a slight forward lean, while keeping the ears, shoulders, one elbow, hips and one ankle in line (upon foot strike as seen in illustration #1 from Chi Running). Illustration #2 shows form that is too upright and does not take advantage of gravity pulling them forward. When athletes run with the proper body lean they tend to choose the stride length at which they are most economical—that is, at which their oxygen uptake is the least for that particular running speed (Cavanagh & Williams, 1982).

The proper foot strike is where the foot lands directly below or slightly behind the center of gravity (rather than ahead of the body) with the midsole of the foot landing flat on the ground and then rolling through to the toes. Landing on the back edge of the heel and overstriding will create a braking motion that wastes energy and can lead to injuries. Landing on the toes overworks the calves and is also inefficient.
Try to avoid allowing the knees to bow in or out and keep the toes pointed straight forward. This can be a challenge for women as we have an increased *Q-angle**.

The shoulders should be relaxed and hang "down" as opposed to being tight or held in a "shrugged" position and they should stay square—facing forward. Excessive upper body rotation creates an opposing cross-force that wastes energy and slows your pace.

Elbows should be held at a 90-degree angle and arms should swing freely. The hands should never cross the midline of the body on the upswing. This too will cause a cross force that is a detriment to running economy and efficiency. Trying to run with stiff arms or attempting to stop arm motion will also shorten your stride and slow your pace. It is a waste of energy and oxygen as your body is "fighting itself."

On the upswing, the hand should come up to the level of the sternum or chest (elbow will then be at your side) and on the back swing, the hand should brush the waist area and be in the vicinity of the "rear pocket" if you had one.

Hands should be gently cupped and not clenched to avoid wasting energy and hindering your body's natural fluid running motion.

Uphill Running: Shorten your stride length! This will give you more strength and help you to keep good running form. More emphasis should be place on an UPWARD arm swing here to reduce the load on your legs. Uphills also require slightly more forward body lean but be sure to keep the body aligned and don't just bend at the waist. Unless it is a VERY steep hill, continue to try to land with the heel and midfoot flat on the ground rather than running on your toes.

Downhill Running: Do NOT lean back at the waist! This will put a lot of pressure on the lumbar spine. Instead, contract or "crunch" your abdominal muscles and tuck your pelvis under you while continuing to have a forward lean from the ankles and landing on your heels first and then rolling through to your toes. Your feet should stay in contact with the ground a bit longer as though you have "sticky feet" and the stride should open up longer behind you to take advantage of the downhill.

Steep Downhill Running: This technique is best explained in person or can be seen in the ChiRunning DVD and/or book.

***Women and Q-angles:** Women usually have wider hips than men and this means that the muscle group on the front of the thigh—the Quadriceps—which originate in and around the hip and femur (thigh bone) and insert at the knee and lower leg will have a more severe angle to them at the points of attachment. Thus, women are more at risk for knee and hip "overuse injuries" such as tendonitis, bursitis, or IT band syndrome to name a few. Proper running form can help to prevent or alleviate these issues.

GOOD LUCK! Make this a lifestyle change that you incorporate into your life for the rest of your life. You'll be glad you did.

Suggested reading: Chi Running by Danny Dreyer

For Personal Training or One-on-One Coaching, please contact:
Tracy Y Thomas, MA, ACSM H/F I, CSCS
BodyMechanic Fitness, LLC
Tracy@BodyMechanicFitness.com
www.BodyMechanicFitness.com
217-714-1388

Running is the cheapest form of psychotherapy!