



## **Developing Proper Run Mechanics**

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Living in New York City means a front row seat to the NYC Marathon and every year I look forward to watching the lead pack of runners sprint up First Avenue. The grace in their running stride looks so effortless, as if they were out for an easy Sunday jog in the park and not turning out sub-five-minute miles. Contrast this to the general masses seen running in Central Park every day and you experience the whole spectrum of running styles.

Through the use of biomechanical video analysis we can point out inefficiencies in one's running style and make subtle changes to help improve your overall running economy.

### **Posture**

Do you run vertical or are you one who leans forward or even back? The most efficient position for your body to be in while running is an upright, straight posture where the center of your head, shoulders, hip and ankle are in a nice vertical line. One's upper body should be relaxed (remember tension here will draw blood flow away from the legs, where it is needed most, just like in cycling), arms hanging loose at the side with a near 90-degree bend at the elbow, hands loose (verses making fists), shoulders back, and your chest out. A relaxed face and jaw will help keep your upper body tension-free. As for the lower body, the hips are pressed forward underneath you and your butt should be tucked in. Running with your butt sticking out behind you (i.e. a sitting position) will limit the range of motion on your legs. Adding an ever so slight forward lean will aid in your balance as your legs extend out in front of you during the running motion.

### **Support and the Foot Plant**

Thinking of the vertical posture outlined above, the most efficient foot plant is having your foot land directly under your hips, offering the greatest support to your running mass. Landing on the mid-to fore-foot allows us to use the spring action of the foot and ankle to help propel the running stride. A slight lean forward will help you land on the front or forward portion of the foot, instead of on the heel (common for those who lean back or over-stride).

Landing on the heel (see photo bottom right) can lead to injuries as it transfers the impact up the leg, through the knee and to the hip. This action will also make you less efficient, as landing on your heels is akin to putting the brakes on. Conversely, landing on your toes (as sprinters do) places a great deal of pressure on the calves.

### **The Stride**

The most efficient stride has a quick, effortless leg turnover where the foot lands directly beneath your body mass. The running effort is aimed at the forward motion. This means your arms should also be moving in a forward motion, to keep your body from bouncing up and down (which wastes energy). As for the rate of turnover, most experts agree that 180-200 steps per minute is the most efficient rate. Over-striding (longer strides and a lower turnover) will lead to landing on your heel, causing a braking action in the motion.

Of course, subtle changes in running form will occur as the terrain changes. When running uphill, one should increase the arm swing motion (always moving forward and back verses across the body) and shorten the stride. For running downhill, drop the arm carry ever so slightly and lengthen the arm swing. Your stride will be longer downhill and a slightly more forward lean will put gravity on your side.

Coupling work on your stride mechanics with lactate threshold testing to determine your ideal training zones (in terms of both heart rate and pacing) should set you on the path for a great racing season!