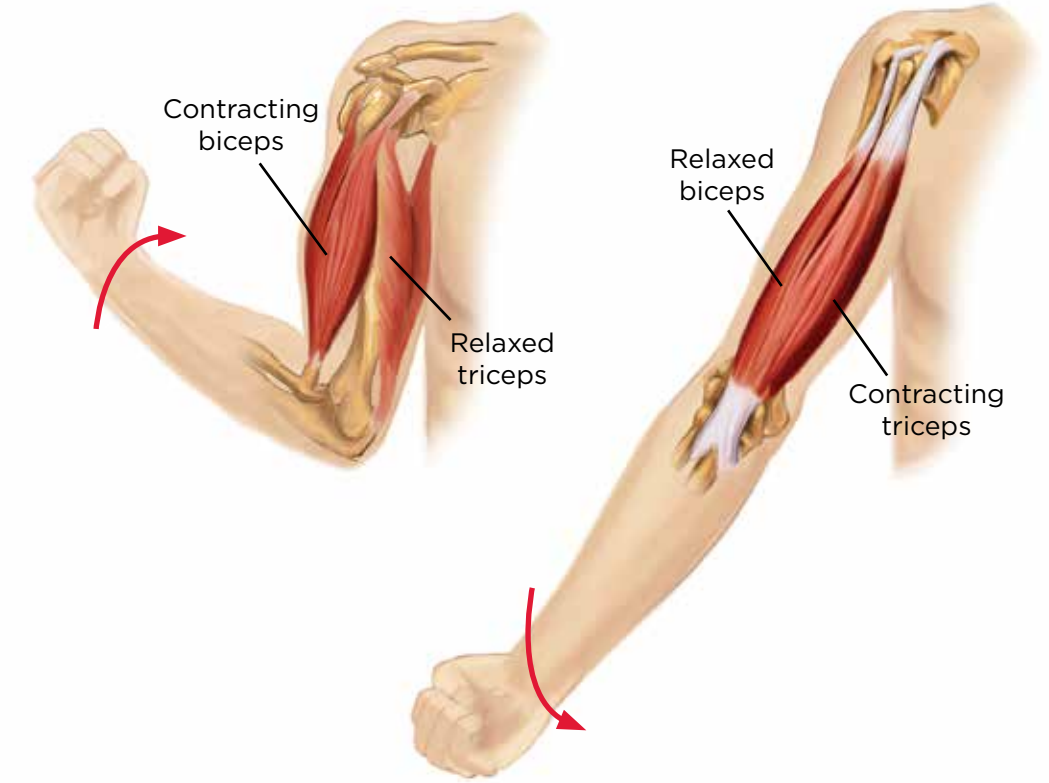
The Dryland Difference

Balance Your Strength Training Program



Just as coaches urge Masters swimmers to spend time on all four strokes for muscle balance and injury prevention, your dryland activities should cover all the bases as well.

AGONIST/ANTAGONIST

An antagonist is not just someone who pushes your buttons; it's one half of a muscle pair.

The agonist moves the limb, and the antagonist returns it to its original position. When you do a bicep curl, for example, the bicep is the agonist that lifts the weight and the tricep is the antagonist that lowers it. Both need to be equally strong, because when one half of a muscle pair tires before the other, the stronger half can force the limb to keep going, but the limb may not follow the biomechanically correct path.

A 2007 article in the *International Journal of Sports Medicine* reported on a study of leg strength imbalances in soccer players whose quadriceps were stronger than their hamstrings. "This difference in resistance to fatigue provokes an imbalance that may affect the stabilizing function of the thigh muscles," the study says. In other words, you can keep moving, but not in a way that is kind to your joints. You will wobble.

Phil Cutti, former head of the Boswell Human Performance Lab at Stanford University and now owner of Catalyst Training Systems, explains further:

One of the reasons athletes set themselves up for injury is not paying attention to the whole picture when it comes to strength training. … [A]thletes in general, not just swimmers, focus on the front side of their bodies, on their quads, abs, biceps and delts. These imbalances influence biomechanics and I think that is the main culprit, especially in sports that occur in a highly repetitive range of motion, like swimming.

Sprinters may want to pay extra attention to balance. In a study published almost two decades ago in the *European Journal of Applied Physiology,* researchers concluded that strength in both the agonist and antagonist muscles was important for the performance of rapid movements. "[S]tronger antagonists could facilitate the arrest of the limb movement in a shorter time, providing a longer time for acceleration."

The U.S. Army agrees, and goes beyond the concept of pairs, dividing muscle groups into quadrants. The Army has a 128-page document available online, titled "Building the Soldier Athlete: Injury Prevention and Performance Optimization." The Army divides the strength training section into upper body push exercises, upper body pull exercises, lower body push exercises, and, yes, lower body pull exercises. You arguably should think in those quadrants too, because "balanced muscular strength is an advantage when performing Soldier tasks such as wearing body armor."

BALANCE THE BACK

Even if you never plan to wear body armor, you should make a conscious effort to balance your pushing and pulling exercises. Examples of good push/pull exercises include:

- Chest press and row
- Dips and pull-ups/lat pull-downs
- Leg extensions and leg curls
- Bicep curls and tricep extensions
- Sit-ups and low back extensions

The second exercise listed in each pair above focuses on the back muscles.

Cutti, 39, and a member of North Bay Aquatics and Night Train Swimmers, suggests that there should be an even greater emphasis on pulling exercises, thanks to the prolonged sitting many of us do at work. Sitting makes our back muscles, the pulling ones, weak.

To create balance out of imbalance, then, you have to overcorrect. Maybe leave off the chest presses and leg extensions in favor of their paired pulling exercise. Although Cutti says both pool and open water swimmers need to work to improve muscular balance, he believes the demands of open water swimming make total body strength and endurance especially important. A talented open water swimmer with some big swims planned for this year, Cutti says he pays more attention to strengthening his back and hamstring muscles.

So whether you're a sprinter, an ocean swimmer, or someone in between, take some time to strengthen your weakness for a balanced body.—*LAURA S. JONES*