Movement & Stabilization

In the second of three columns, chiropractor and educator Dr. Joe Muscolino and his wife, Pilates instructor Simona Cipriani, give *Pilates Style* readers a close-up look at the anatomy involved in movement and stabilization.

by Dr. Joe Muscolino and Simona Cipriani

A new client, diagnosed with rotator cuff impingement syndrome, recently signed up for sessions at Simona's studio, The Art of Control. During our discussion about a rehabilitation program for the client, we determined that we should focus on strengthening and stabilizing her shoulder girdle.

When most people observe a movement pattern, they see the motion. But equally important is the stabilization that is necessary to help create efficient, graceful motions. Here, we explain the anatomy involved in stabilization and movement, and why it's important to understand, especially when working with clients who are injured.

Q. What is the difference between muscles that create movement and muscles that stabilize?

A. Muscles that create movement are (appropriately) called movers and are also known as agonists. When an agonist contracts, it shortens and pulls on both of its bony attachments. Usually, we only want one of its attachments to be mobile; we want the other attachment to be fixed.

This is where stabilization becomes important. Stabilizer muscles contract isometrically to stop movement of one attachment. By stabilizing this attachment, the agonist can more efficiently concentrate its pulling force on the mobile attachment, creating a stronger and healthier movement than otherwise would have occurred. Indeed, coordination largely results from efficient co-ordering of agonist and stabilizer muscles.

Q. Why do Pilates teachers need to know the difference between mover and stabilizer muscles?

A. When clients have injuries, the problem is often due to weak stabilizer muscles, not just weak agonists. Rotator cuff injuries, for instance, are often caused by weak shoulder stabilization. This is especially true with lateral movements (abduction) of the arm. When a muscle that is attached from the scapula (of the shoulder girdle) to the humerus contracts, it creates a pulling force that pulls the upper arm toward the scapula while also creating a pulling force that pulls the scapula toward the upper arm.

An example is when the deltoid contracts to laterally move (abduct) the arm. The deltoid also rotates the scapula in a downward direction (Figure 1). This both weakens the ability of the client to raise the arm and causes

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FIGURE 1. FROM MUSCOLINO JE: *KINESIOLOGY, THE SKELETAL SYSTEM AND MUSCLE FUNCTION*, ED. 2. ST. LOUIS, 2011, MOSBY. MODELED FROM PHOTOGRAPHS TAKEN BY DONALD A. NEUMANN, PT, PHD, PROFESSOR, MARQUETTE UNIVERSITY.

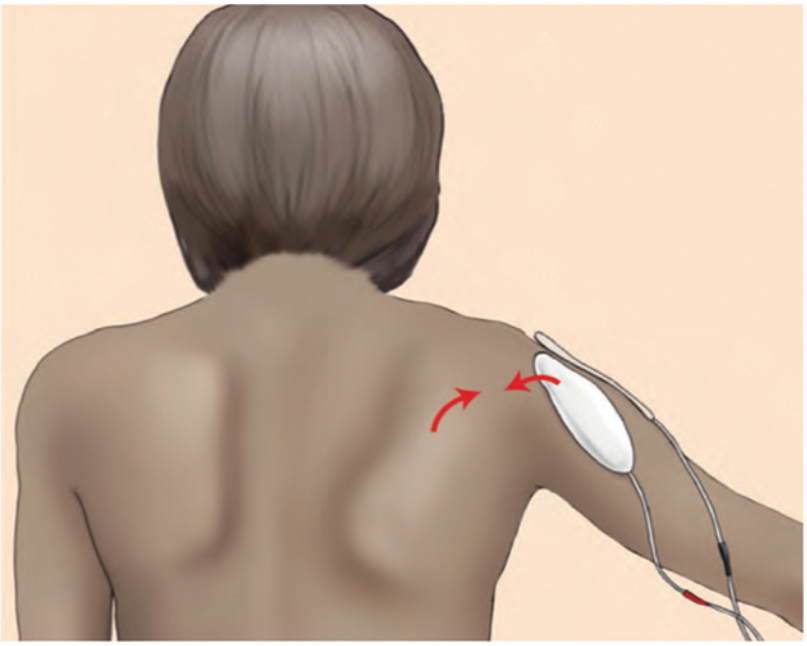

FIGURE 1. When the deltoid contracts to abduct the arm, it also downwardly rotates the scapula. (Note, in this illustration, E-stim pads are seen causing this contraction.)

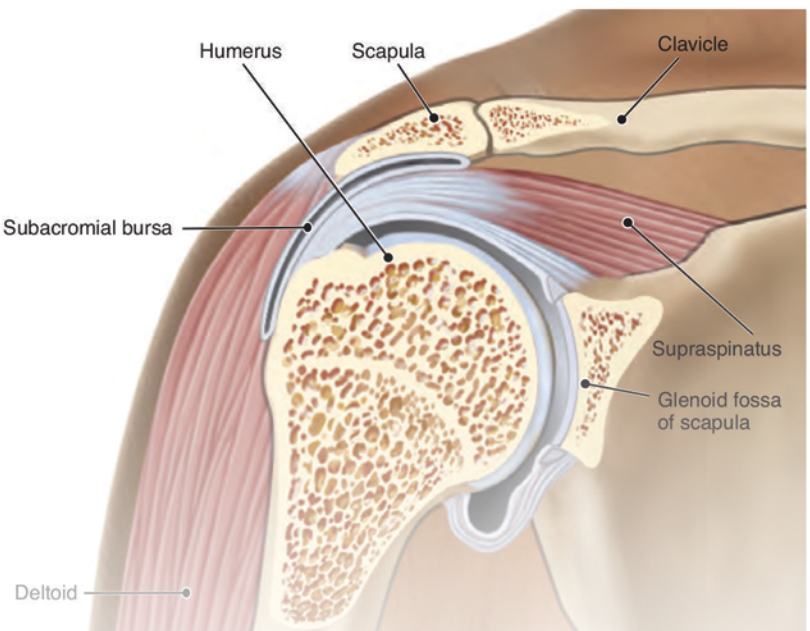

FIGURE 2. The rotator cuff tendon and subacromial bursa of the shoulder joint are located between the scapula and humerus. If the shoulder girdle is not well stabilized during motions of the arm, these tissues can be injured.

The Bigger Picture of Stabilization

The concept of stabilization can be broadened to include almost every movement pattern of the body. Indeed, most movements involve stabilization of one part while another part moves. A dancer cannot gracefully extend one leg into the air unless she stabilizes her other leg to balance on it. This is true even of fine motor skills: Almost any time a person performs intricate work with one hand (usually the dominant hand), the other one functions to stabilize whatever is being worked with.

E: THE MUSCULAR SYSTEM MANUAL: THE SKELETAL MUSCLES OF THE HUMAN BODY, ED. 3. ST. LOUIS, 2010, MOSBY.