Mobility Screening for the Core, Part 3: Implications for Athletic Low Back Pain

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IN PARTS 1 AND 2 of this series we discussed the importance of assessing and treating mobility deficits of the core. The emphasis was on normalizing functional movements before prescribing a traditional core-strengthening program. Recent research that has focused on neuromuscular impairments and movement dysfunction in those with low back pain has exposed links between low back pain and impairments in the muscles of the local system, namely the lumbar multifidus and transversus abdominis,[1,2] as well as movement deficits shown to be associated with lumbosacral pain.[3,4] The aim of this column is to introduce the concept of local stabilization, its role in low back pain, and the integration of core-mobility testing and training into the treatment and prevention of nonspecific low back pain in athletes.

Local Stabilization

The concept of "local stabilization" has gained recent popularity and was first described by Bergmark[5] when he contrasted it with the global stabilization system. Local stabilizers function separately from the global system to create segmental stabilization, or stabilization of one spinal segment on another. In a normal state, this deep-muscle activation occurs before activation of large torque-producing muscles, in a preparatory manner. In the presence of low back pain, or after an episode of low back pain, local muscle activation is delayed, contributing to recurrent back-pain episodes and microtrauma. The importance of local stabilization in athletic low back pain is described by Hodges.[6] Details of clinical testing and intervention of the local muscle system are beyond the scope of this column; for a well-developed clinical model on testing and training of the local muscle system, readers are referred to the original work of Richardson[7] and athletic application as described by Prentice[8] for further study.

Functional Movement

The importance of assessing functional-movement patterns, including the deep squat and total rotation, was emphasized in Part 1 of this series. In addition, the forward-bend test should be used when assessing athletes with low back pain. Forward bending (can the athlete touch his or her toes?) is commonly used to assess movement quantity. The focus in this context is to determine the relative contribution of each part (hips, lumbar spine, thoracic spine) to the total movement. Limited motion at one part can lead to excessive compensatory motion at another, contributing to low back pain.[9] This is of particular concern in athletes, because most field and court sports require repeated trunk movement.

Functional-Movement Testing

In addition to the two functional-movement tests we covered in the earlier parts of this series, the deep squat and total rotation, we recommend assessing composite trunk bending with the forward-bending test. This test is performed by simply having the ath-

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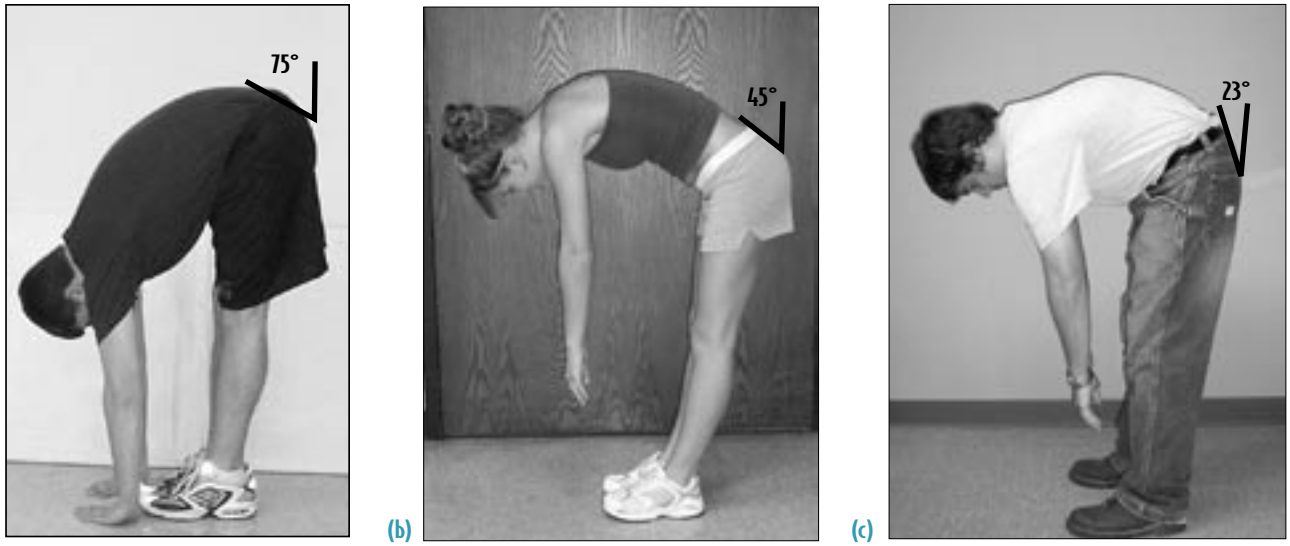

Figure 1 (a) Athlete completing forward bending with sacral angle > 70° and adequate quantity of movement. (b) Dysfunctional forward bending is noted with sacral angle < 45°, excessive posterior weight shift, and relative plantar-flexed ankles. (c) Dysfunctional forward bending with sacral angle of 23° and excessive lumbar flexion.

lete stand with the feet nearly together, then naturally bend forward as if trying to touch the toes. The key point of assessment is the sacral angle. As the athlete bends, place your hand flat on the sacrum and assess the amount of movement. A normal test would include the sacrum moving to 70–80° (near parallel with the floor) and the athlete easily touching the toes (Figure 1[a]). Proper sacral movement indicates normal hip contribution to the forward-bending movement. If the hips do not contribute properly to forward bending, compensatory movement often occurs, with excessive flexion in either the lumbar or thoracic spine. Excessive posterior weight shifting of the lower extremities and relative plantar flexion at the ankle are other common compensatory mechanisms (Figures 1[b] and [c]).

Functional-Movement Intervention

Exercise and mobilization intervention for the deep-squat and total-rotation tests were outlined in Part 2 of this series and are to be included as appropriate. To correct forward bending, the isolation phase includes hip-flexion mobilization with movement (Figure 2). The integration phase includes hands-and-knees rocking for hip-flexion mobility and the waiter's-bow exercise as described by Sarhmann.[9] The hands-and-knees rocking exercise is designed to emphasize hip-flexion motion without compensatory motion at the lumbar or thoracic spine (Figure 3). Next, the athlete is progressed to the waiter's-bow exercise. This is done with a dowel placed along the spine to ensure that no spine flexion occurs as the athlete hinges at the hip,

Figure 2 Hip-flexion mobilization with movement. (a) Start position for mobilization with inside hand (clinician's left) supporting the subject's ilium and with the clinician inside the belt. The clinician applies lateral force through the belt by squatting slightly. (b) In forward-flexion mobilization, the athlete moves actively through hip-flexion range of motion, and the clinician applies overpressure at the end range.