VERUSE INJURIES SUCH as muscle strains are considered common pathologies primarily in athletes who participate in extremity-dominated sports. When athletes are withheld from participation because of overuse injuries of the upper or lower extremity, much of the rehabilitation process focuses on injury repair, local muscle strengthening, and related conditioning so that the athlete can return to competition with minimal chance of reinjury. Oftentimes, however, extremity-muscle weakness can result from an inability to transfer forces generated at the trunk to the extremity itself, and not addressing the role of trunk flexibility and strength can contribute to chronic injuries. The process of using force generated in the trunk and transferring it to the extremities is referred to as the serape effect.

Injuries to the extremities are often treated symptomatically, with little attention paid to the core components of the body. Having deficits in core strength and flexibility in addition to extremity pathology reduces the likelihood of symptom-free return to activity and competition. Furthermore, athletes who do return to activity symptom free might eventually develop recurring pathology if the underlying cause of the extremity injury was a result of trunk-muscle weakness or lack of flexibility.

The main functional movements that one should concentrate on when attempting to strengthen the body’s core musculature are rotational components (see Figures 1 to 5). Muscles such as the internal and external obliques, latissimus dorsi, and serratus anterior and posterior work together to establish core strength that can be stored as potential energy and then transferred into kinetic energy for force production in the extremities. Each of these muscles has an attachment that spans across multiple levels of the trunk. These attachments are angled in such a way that a shortening of the muscle fibers via an active contraction results in rotational movement of the trunk. Each of these muscles is anatomically bilateral in nature; thus a sagittal-plane exercise would actually initiate a contraction of both the left- and right-side muscle. To take advantage of the rotational component from both a strengthening and a flexibility perspective, unilateral functional activities must be performed and emphasized in a coordinated manner such that when one side is contracting and shortening its fibers, the contralateral muscle is elongating its fibers. This most closely mimics functional activities that can benefit...
from the advantages of incorporating the serape effect into one’s performance.

It is not unusual for these trunk muscles to be restricted in terms of their flexibility and therefore their ultimate ability to produce force. It is believed that muscles are able to produce maximal amounts of force when they are in a position of approximately 110–120% of their resting length.² Oftentimes, trunk rotational muscles can be inherently limited in range of motion as a result of the thoracic cage and its stabilizing role in protecting the trunk.

Using core strength to assist with extremity muscle-force production can also serve to compensate for underlying extremity-muscle weaknesses. Thus, the serape effect should be used not only as a rehabilitative tool but also as part of an athlete’s basic strength and conditioning program. Benefits of such a program are not only seen with throwing athletes; results are equally visible with those who perform kicking motions, such as soccer players. Furthermore, athletes

Figure 2  Trunk rotation to the right for lower extremity energy transfer using a physioball.

Figure 3  Stretch into right trunk rotation to increase flexibility.

Figure 4  Incorporating trunk-rotation strengthening activities into functional performance (upper and lower) using jump-stretch elastic bands.

Figure 5  Trunk rotation using a medicine-ball pass to a partner.
such as swimmers can benefit from the transfer of energy into both the upper and lower extremities during most strokes.\(^3\)

To maximize the ability of trunk rotation, maximal rotational flexibility must be established. This provides for a “winding up” of the trunk. When an athlete is able to achieve a greater rotational range of motion, it allows for a longer lever arm for the muscles to use in producing force. This in turn promotes maximum benefits for energy transfer. Thus, it is important to address both the flexibility and the strength of these trunk rotational muscles in rehabilitation and daily conditioning programs for all athletes, whether they participate in an upper- or lower-extremity-dominated sports.

References


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