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Point/Counterpoint: Are Specific Spine Stabilization Exercises Necessary for Athletes?

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Are Specific Spine Stabilization Exercises Necessary for Athletes?

summary

The issue of spine stabilization has received considerable attention in recent years; although there are many proponents for specific training of spinal musculature, there is debate as to whether it is beneficial and required for athletes.

PRO Spine stabilization exercises should be included in the strength and conditioning routines of all athletes. The ability to stabilize the spine is necessary to reduce the athlete's risk of injury, to aid in rehabilitation after an injury, and to enhance athletic performance.

Sports-related injuries to the spine may result in a loss of practice or training time, missed competitions, countless hours of rehabilitation, or possibly the end of an athlete's career. Deficient core training may contribute to an athlete experiencing a sports-related back injury. Researchers have identified that those with deficient muscular endurance ca-

capacity and muscular imbalances of the spine have a greater risk of sustaining a back injury (1, 3).

An immediate goal of spine stabilization training is to increase the athlete's entire core endurance capacity. The strength and conditioning professional can assess qualitatively an athlete who has poor core activation and quantitatively an athlete who has poor core endurance capacity. Obtaining both qualitative and quantitative data enables the strength training professional to track the athlete's response to a training program and to advance or modify the program as necessary. To highlight the need for implementing a spine stabilization program, have your athletes perform an abdominal bracing maneuver (cocontraction of the abdominal and back muscles without inward or outward movement of the abdominal wall). The athlete's ability to coactivate his or her trunk musculature with an abdominal brace may seem like a rather simple task, but many athletes are unable to perform this fundamental skill. A spine stabilization program incorporating specific exercises for each functional muscle group will activate these muscles and will increase the athlete's endurance capacity.

Compared with an ankle sprain or an anterior cruciate ligament reconstruction, the timetable to return to sport after a back injury is less defined. Trunk musculature activation patterns become dysfunctional after an injury to the spine, challenging rehabilitation and complicating exercise prescription. Inappropriate or deficient rehabilitation, combined with returning too soon to practice or game situations, may set the athlete up for reinjury. Identification of all dysfunctional muscles and muscular imbalances is important when designing a rehabilitation program. A thorough rehabilitation program will address dysfunctional musculature through the prescription of specific stabilization exercises, allowing for the safe increase in endurance capacity while protecting the spine from injurious stresses.

Spine stabilization exercises also serve to enhance athletic performance. The trunk is one component of the functional kinetic link system. Overhead-throwing athletes, among others, generate power from their lower extremities and transfer those forces through the trunk to the upper extremity (2, 3). This distal to proximal sequencing affords the upper extremity the ability to achieve maximal acceleration at the largest possible speed (2). Dysfunctional activation

of the trunk musculature may result in poorer athletic performance. A dysfunctional trunk also places the athlete at risk of injuring a distal segment. The baseball pitcher who has a dysfunctional trunk still will attempt to perform at his optimal level late into a game. The forces generated by the legs will be incompletely transferred to the upper extremity. The pitcher will automatically compensate for this by attempting to generate more torque at the shoulder. Repeating this sequence enough times can lead to excessive loads on the shoulder, resulting in a rotator cuff injury. It is key to establish adequate endurance capacity of the trunk to improve consistent athletic performance.

All athletes require the ability to stabilize the spine. Specific spine stabilization exercises, such as the side bridge, the bird dog, and crunches, are necessary to activate these muscles and ensure that the athlete is able to meet basic endurance capacity criteria (3). Once the athlete meets these training goals, other training modes for the core may be progressed to meet sport specific demands. ♦

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CON Spine stabilization exercise has become both a staple and a panacea in exercise programs of all types. Clearly, the number of articles

written on this subject in *Strength and Conditioning Journal*, as well as other publications, illustrates just how important this topic is considered by exercise professionals. In athletic conditioning, the rationale for using spine stability exercises is often to enhance both injury prevention and performance. Despite the number of popular approaches currently being promoted, the strength and conditioning professional must be aware that these practices often represent a biased perspective that contradicts the current evidence.

Misconceptions about spine stabilization mechanisms are abundant and mostly relate to a limited understanding of the scientific literature or to a lack of appreciation of the intended scope of the research. For example, a central argument often is made for specific training of transversus abdominis and multifidus, often called the deep stabilizers, as key muscles essential to improve athletic performance via enhanced spine stability. However, the widely cited body of research by Australian clinical researchers has considered only rehabilitation for low back pain and has never considered their protocols as a means to improve athletic performance. Progress in these studies has been measured by decreases in low back pain and not increased physical performance of any type. In fact, subsequent controlled longitudinal studies using some of the popularized spine stabilization exercise approaches have been unable to support claims of enhanced injury prevention (2) or enhanced performance (3) in athletes.

Treatment and prevention of dysfunctional muscle activity is a common rationale for incorporating specific spine stabilization exercises into conditioning programs, yet there is not one valid practical measurement tool to allow the strength and conditioning professional to determine the presence of dysfunc-

tional muscle activity in asymptomatic athletes. Despite claims by many advocates of spine stabilization approaches, muscle activation dysfunctions have never been described scientifically during voluntary movements. Instead, delayed muscle onset times were measured using electromyography during reflex control studies, and occurred at less than 0.006 of a second—far too small a delay for the exercise or rehabilitation professional to identify any such dysfunctions either visually or by using palpation.

For healthy athletes, popularized spine stability approaches offer questionable extrapolations of rehabilitation techniques, because these exercises do not satisfy many of the basic aspects of the specificity principle, such as the type of muscle contraction, amplitude of muscle tensions (overload), rates of force development, or fiber-shortening velocities, that we would expect to be necessary when prescribing strength and conditioning exercises for other body parts. Research has shown that improvements in the performance of specific spine stabilization exercises does not translate to improvement in physical performance (3) or injury prevention (2). The strength and conditioning professional must be aware that performing an exercise while laying supine or supported on unrelated surfaces, or performing movements that merely simulate the outward appearance of an athletic performance task, will do little or nothing to further improve stability.

In fact, spine stability is a highly complex process that is context-dependent, in which the muscles involved and their relative activity changes depending on the stability required for the demands of the activity being performed. Despite the particular attention paid to training transversus abdominis and multifidus, these muscles alone are unable to support against even modest spine torques (1) and as

such should not be paid specific attention in conditioning programs for healthy athletes. Research has underlined that all muscles are important in the stability of the lumbar spine, especially during higher effort tasks seen in sports and strength and conditioning exercises.

Although there is a case for specific spine stabilization exercise in treating low back pain, it should be clear that prolonged use in healthy athletes has no effect on improving performance or decreasing the risk of injury. Prescribed to the exclusion of higher-force exercises (which often are accused of having a high risk of injury), strength and conditioning professionals may inadvertently increase the risk of low back injury for many athletes, particularly those in strength and power and/or contact sports. This is because the athlete may not develop the required level of muscu-

lar conditioning to protect the spine against the acute or cumulative demands of their sport. The most important factor in preventing an acute or recurrent injury is to emphasize spine position awareness during all dynamic movements. Methods to optimize injury prevention and to improve performance in athletes must further consider programming and organization of all training and recovery. Prescribing spine stabilization exercises without regard to the demands of an athlete's sport represents an overly simplified approach to spine stabilization. Spending an inordinate amount of time on submaximal isolation or other (e.g., balance) exercises that do not fulfill the athlete's long-term goals for specific preparation or competition will limit performance and ultimately increase risk of injury. ♦

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