



**Central States  
Orthopedics**

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# SPORTS MEDICINE MONTHLY

Editor: Darren H. Lunow, M.Ed, ATC, LAT, Athletic Trainer

*Surgical & Non-Surgical Care. Sports Medicine. Physical Therapy.*

## CORE STABILITY

Today many coaches and parents understand the importance of increasing and maintaining appropriate core stability for those who compete in sanctioned athletics and recreational activity. However, many would also admit that they do not fully understand exactly what core stability means. In short, we have two working definitions that can be applied to core stability:



- A. The ability of the abdominal & lumbar musculature to provide support and stability to the bones, ligaments, and joints of the lumbar spine, and
- B. The ability of the body to transfer force effectively and efficiently from the lower extremity to the upper extremity or even vice versa.

From an orthopedic and sports medicine standpoint, it is not uncommon to find that most "core strengthening" programs focus very heavily on the principle of force transmission but will often not provide sufficient focus on lumbar spine stability. For example, in the last few years any number of athletic trainers or physicians would probably tell you that they have noticed an increased prevalence of lumbar vertebral stress fractures in adolescent athletes. Most commonly seen in sports like gymnastics, cheerleading, football, and cross country; these are excellent examples of sports that require tremendous amounts of force transmission through the core and likewise require great core stability as well. However, when corresponding lumbar spine stability is not sufficiently adequate, this force transmission from one extremity to the other stresses the joints, ligaments, and bones of the lumbar spine to the extreme loading and the increased ranges of motion that usually lead to subsequent injury.

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## Re-Focusing the Core Workout

For some, the idea of a core workout is only specific to activities like a squat or dead lift that involve massive amounts of weight and force transmission. Occasionally, some will also add in abdominal crunches as well. However, it is in fact these types of activities that can actually predispose athletes to lumbar spine injuries if they lack proper core stability prior to doing such. How you may ask? The answer is really quite simple, but it requires a quick anatomy refresher course first.

When viewed from the lateral aspect, the lumbar spine curves anteriorly in its design. Now while some spines curve more or less than others, the point to focus on is that almost all do curve. With that in your thinking, now load a 225lb. squat bar on top of that lumbar spine. By doing so, this added force is now placed on the bones and ligaments that make up the anterior curvature of the lumbar spine and without sufficient anterior and posterior spinal stabilizing muscular strength to maintain the original position of the curve, the anterior curvature of the lumbar spine subsequently increases (aka: extends further). Why is this a problem? Two reasons:



- A. Increased load and
- B. Improper loading

Anyone who has ever worked in heavy lifting with forklifts, cranes, and rigging is now beginning to see a major concern. When any structure is improperly loaded and that same structure is also overloaded, structural failure is not usually very far away. In the context of the lumbar spine, this is where strains, sprains, and stress fractures begin to show up.

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**Re-Focusing cont...**

So how do you prevent improper loading of the lumbar spine?

**1. Maintain a Neutral Spine Position**

From the previous discussion on the anatomy and the physiology of the lumbar spine, it is easy to see that the first focus of core strengthening is to maintain the lumbar spine in its neutral position. Therefore, activities such as planks, bridges, and pushups on a stable surface or even on a plyoball are an excellent addition. Likewise, standing activities such as light-weight squats and kettle bells that have the primary focus on core and spine position are excellent for encouraging safe lumbar spine positioning while also increasing the strength to maintain it.

**2. Train Controlled Acceleration & Deceleration**

Ideally every movement performed by the lumbar spine is to be stable and controlled from its start to its end. Unless this is trained, it usually does not occur. In as much as slamming a door is not good for either the door jam or the door itself, appropriate core stability in acceleration and deceleration movements keeps the bones in the joints of the lumbar spine from "slamming" into each another. Activities such as wood choppers, med ball rotations with a crunch or a toss, and lunges with a lateral trunk rotation are excellent for practicing neutral spine positioning while also strengthening the core for the acceleration and deceleration rotational activities that are so prevalent in athletics.

By implementing exercises like these for the 4-8 weeks prior to the heavy lifting (i.e. squats, cleans, etc...) you not only protect the lumbar spine, but you also will see greater strength gains on the heavy lifts as well.

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**Injuries to the Lumbar Spine:  
What to look out for?**

As a coach or a parent who is responsible for creating and/or supervising a lifting program for athletes, here are a couple of items that may indicate to you that your athletes don't have the core stability they need.

-Consistently poor posture in both sitting and standing  
\*Back flexed, shoulder blades forward, and neck extended

-During a squat, the athlete's back extends (aka: curve of the lumbar spine increases) in the bottom of a squat prior to coming up out of the squat.

-In throwing sports, athletes who are "arming" the ball are usually doing so due to arm fatigue, inefficient synchronized rhythm between their lower extremity and the upper extremity during their throw, inadequate core strengthening, or a combination of some or all of the above.

-Any athlete who tumbles frequently (i.e. back tucks) is predisposed to injuries in the lumbar spine. Other than starting these athletes on the core exercises previously discussed, realize that these athletes will usually hyperextend their spine even more because they are attempting to compensate in rotation for what they lack in vertical jump height due to strength deficiencies in the quadriceps, calves, and hip flexors.

-Consistent (i.e. 4+ weeks) back pain without any distinct mechanism of injury.

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