CHAPTER 2

MIDLINE STABILIZATION AND ORGANIZATION

(SPINAL MECHANICS)

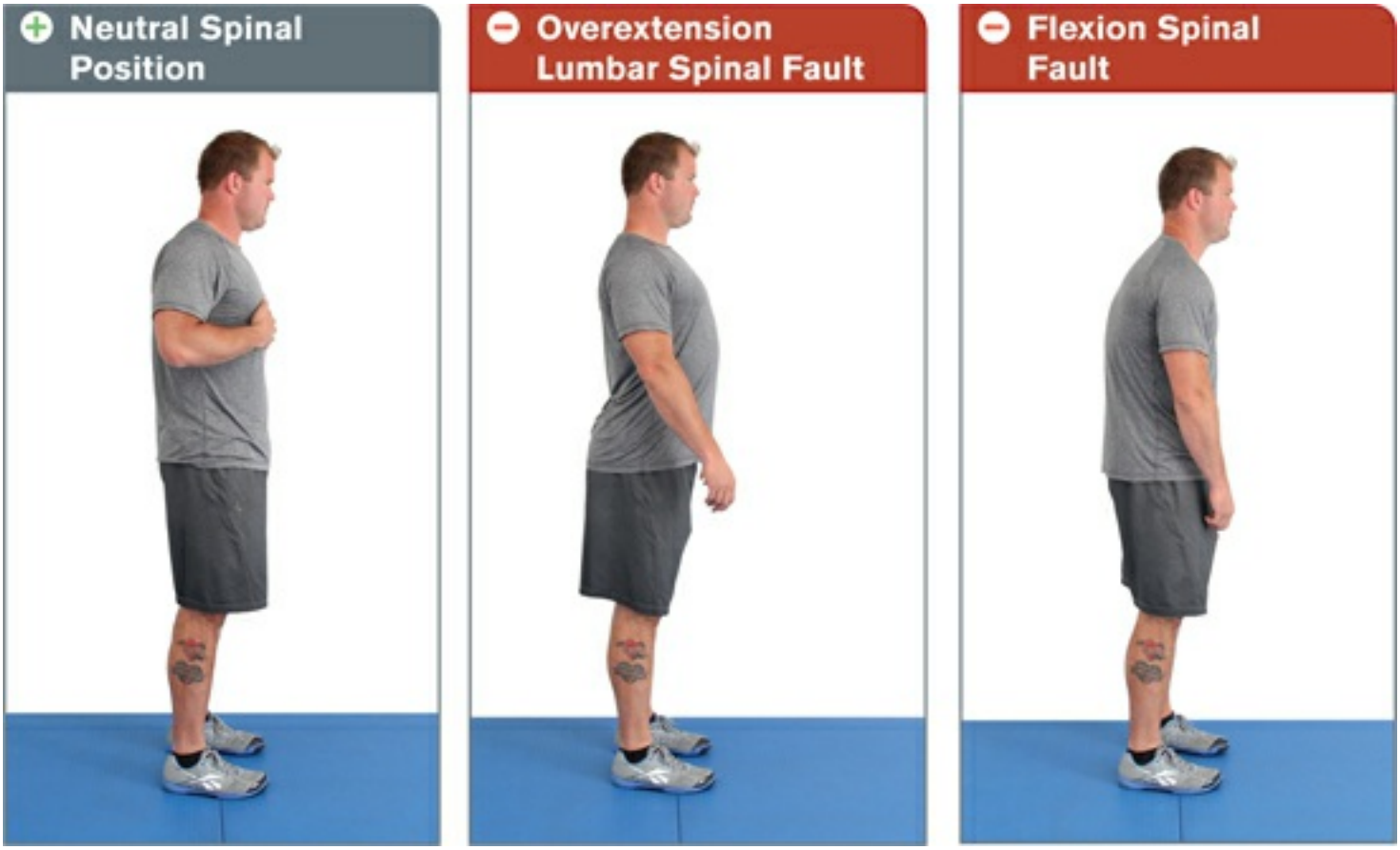
Throughout history, advanced thinkers have harped on the importance of tightening the body, bracing the abdomen, and stabilizing the trunk. The "core to extremity" concept is not a new idea. If you don't organize your spine optimally, you can't stabilize and transmit force to the primary engines of your hips and shoulders. This results in staggering losses of stability, force, and power—all of which could be otherwise channeled into fusion-reactor-hot athletic performance.

Yet the spine remains the weak link. In my physical therapy practice, I see trunk-related errors and weaknesses among the world's best athletes. A stable, well-organized spine is the key to moving safely and effectively *and* maximizing power output and force production. So why do so many athletes regularly commit fundamental spinal sins that impede performance and invite injury?

There are a few reasons. For starters, many athletes focus on completing the lift or movement with little or no regard for good form. Speed is often part of this equation, too. Consider an athlete craning his head back to reach his chin over a bar during a pull-up. After all, it's still possible to generate huge amounts of force from a bad position without immediate, overt negative consequences. I've seen athletes lift enormous loads from rounded and overextended positions and walk away unharmed, grinning from ear to ear. This isn't always bad, and by that I mean that it may be a *conscious* choice by a professional athlete who has measured what he stands to gain against the cost. One example: the powerlifter who chooses to round his back to break the

deadlift world record. He knows damn well he's flirting with potential injury, but he's willing to take the risk. Another example? The Major League pitcher throwing fastballs at 100 mph is less concerned with his elbow than with a multi-million-dollar contract. Again, these are conscious choices.

For most athletes, however, the risk is not worth it. Moving incorrectly, especially in a training environment, not only increases susceptibility to injury, it develops and reinforces faulty body mechanics that will exact payment during more complex movements. Patterns repeated in practice will be revealed at game time. Rounding your back for a deadlift will ensure that you tackle with a flexed spine. Your dysfunctional, overextended spine, pushup position will transfer to overextension in your running. Sure, there is a strength stimulus of sorts, but—and this is a critical message I want you to hear—sacrificing good form will cannibalize your potential benefits. Hear this too: You may get away with poor form at first, but poor mechanics—whether rounding your shoulders in a deadlift or slumping in your computer chair—will ultimately come down hard in the form of pain and injury.



Athletes who aren't aware of these fundamental truths will compromise form by default when training and competing. Of course, they'd never do this if they immediately felt the consequences of their actions, but often they don't. As I've said, you can lift with a rounded back, run like crap, and sit at your computer with your neck and shoulders rounded for a long time … until you can't. That's when your body offers up some hard truths—that you've been moving incorrectly or that you've been hanging out in bad positions. And it doesn't just whisper in your ear; it crams the message down your throat by zapping your ability to generate force and opening the floodgates to pain.

Another problem that keeps athletes from prioritizing midline stabilization or organizing the spine properly is the practice-makes-perfect paradigm, which coaches unfortunately reinforce. Fact is, we do a *great* job celebrating the completion of fifty pushups, but we haven't done a good job of identifying loss of good spinal positioning for our

athletes. If you accomplished such a task with a back that looks like a snake that's been hit by a car, you've just taught yourself to generate pressing force from that broken spinal position. And exercise is only the half of it. If you sit at a computer all day with a rounded back, it shouldn't come as a big shock to you that you can't brace your spine in a good position and stabilize your shoulders during loaded athletic movements.

Then again, athletes aren't completely to blame. Many simply lack a model for bracing their spine (not to mention the fact that most chairs are designed for aesthetics not function). While trainers will talk obsessively about core strength, posture, and bracing, they seldom teach athletes how to organize and brace their spine as an independent sequence. Instead, they attempt to ingrain midline stabilization in athletes as they practice complex movements. This is like teaching a child how to ride a bike and juggle at the same time. The child might get the juggling part down, but there is a good chance he will crash that bike into the nearest mailbox. When midline stabilization isn't taught by itself, the result is often poor bracing strategies. And poor bracing strategies ultimately lead to a host of biomechanical compromises.

Three Reasons for Bracing Your Spine

There is a step-by-step blueprint for stabilizing your spine: It's called the "bracing sequence." But before I delve into that, you should understand the reasons for prioritizing spinal mechanics over everything else.

First, learning how to brace your spine in a good position eliminates one of the greatest threats to the human animal: injury to your central nervous system (CNS). If you injure the meniscus in your knee, you can still soldier on—you can still run, still fight. It might not be all that pleasurable, but you can go on with your life. If you herniate a disk or injure a facet joint, on the other hand, it's game over: The whole human mechanical system shuts down. You are unable to run, lift, move

quickly, reproduce, have fun—you can't do jack squat. And it is not a minor interruption; potential injuries to your spine are a hard bell to unring. There will be a long, brutally slow healing process on the docket. In my practice, if an athlete has a little spinal tweak, it's a minimum of two days to get that athlete back into training. And that's for a minor positional fault. We regularly get calls from athletes who have missed a week or two after a minor spine tweak. This is two weeks of preparation (not to mention two weeks of less-than-optimal life experience) missed because of a simple and preventable trunk-related error. Still think that that extra back squat with an overextended lumbar spine was worth it?

Second, a disorganized spine will lead to mechanical compromises. For example, I regularly run into athletes who look as if they have horribly restricted posterior-chain tissues—specifically their hamstrings. Old school thinking would have us fix the problem by stretching those stiff cables running down the backs of the legs. While this may in fact improve hamstring flexibility, it doesn't alleviate the back pain. What we've found is that if we simply organize an athlete's spine into a braced, stable position, range-of-motion improves by upwards of 50 percent. This is why we prioritize midline stabilization and good movement mechanics over mobilization techniques, because what often looks like tight musculature is really just the body protecting the nervous system. So before we have someone smash the crap out of his hamstrings, we make sure his spine is in a good position.

Third, when you lose spinal positioning—head, ribcage, or pelvic fault—you potentially shut down force production and lose the ability to stabilize your hips and shoulders. That's right, your shoulder and knee pain could stem from your trunk instability.

To clarify this, think of your trunk and spine as a chassis for the primary engines of your hips and shoulders. If your spine is in a bad position, creating a safe, functionally stable hip, knee, ankle, or shoulder position is impossible. Again, that's why we fix spinal positioning before we go after the poor mechanics or tissue restrictions at the shoulders or

hips: You'll never fix those big engines if the chassis is broken.

So it doesn't matter what is going on at your shoulder, elbow, knee, or ankle—whether it is a motor-control or mobility issue: If your spine is out of whack you're never going to be able to fix the problem.

The Bracing Sequence

To reiterate, people default into mechanically unstable spinal positions for three reasons:

1. They have a task-completion, get-the-job-done mindset.
2. They've ingrained poor positions and movement patterns in their training and day-to-day life.
3. They don't have a reproducible, all-encompassing bracing strategy that transfers to the majority of movements.

The bottom line is that you need to have a conscious plan for bracing your spine in a neutral position, a step-by-step template that will give you the same results every single time. That way, when you're tired, scared, or under stress, your default motor pattern is the same: you revert back to the same mechanically stable, neutrally braced spinal position.

Bracing Sequence

STEP 1

Squeeze your butt as hard as you can.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The first thing you need to do is set your pelvis in a neutral position. To accomplish this, position your feet directly under your hips—keeping your feet parallel to each other—screw your feet into the ground and squeeze your butt as hard as you can. Don't think about tilting your pelvis. Just squeeze your butt. You will always end up in the right position because it's your butt—those glutes were engineered specifically for your pelvis and spine. A lot of people mistakenly think they can get tight by simply engaging their abdomen. Although the musculature of your trunk stabilizes your spine, it's nearly impossible to use your abdominals to control the position of your pelvis. For that reason, you have to use your butt to set the position.

STEP 2

Pull your ribcage down.

Next, pull your lower ribs in, balancing your ribcage over your pelvis. Imagine that your pelvis and ribcage are two bowls filled to the brim with liquid. The idea is to keep your pelvis and ribcage neutral so that liquid doesn't spill out either end. If you overextend, water pours out the front of your pelvis and out the back of your ribcage. If you round forward into flexion, water pours out the back of your pelvis and out the front of your ribcage. Although this analogy only applies to standing perfectly upright in a braced-neutral position—you can still be in a braced-neutral position and hinge forward or lean back—the idea is to get your ribcage and pelvis aligned.

STEP 3

Get your belly tight.

The next step is to lock your pelvis and ribcage in place with your abdominals. You can't move with your butt squeezed so you need to lock in the position by engaging your abs. Think about it like this: Glutes set position, abs brace position. And you need at least 20 percent tension to set and maintain a braced-neutral spinal position. To correctly execute this step, continue squeezing your glutes, take in a big breath of air, and then exhale. As you let the air out, engage your abs and get your belly tight. Think about shrink-wrapping your spine with your abdomen by pulling your bellybutton to your spine. It's not sucking in or hollowing; it's not even drawing in; it's stiffening in place as you exhale. As the musculature of your trunk compresses toward your midline, you create a higher intra-abdominal pressure around your spine, creating an even more rigid lever. Another way to approach this step is to think about lifting your pelvic floor, which is expressed with the common cue sphincter to bellybutton. With your spine neutral, butt squeezed, and your belly tight (stiffening as you exhale), now you can breathe into that tight space or already compressed spinal system as if you were putting compressed air into a steel tank. You don't make the tank tight around the air; you put air into the rigid tank (see "Breathing Mechanics," see here).

STEP 4

Set your head in a neutral position and screw your shoulders into a stable position.

Lastly, center your head over your shoulders, and gaze forward. Think about aligning your ears over your shoulders, hips, and ankles. As you do this, draw the heads of your arm bones back, spreading your collarbones wide, and release your shoulders down. Keep your thumbs pointed forward and think about aligning. Note: You don't need to squeeze your shoulder blades together; just feel the tips of your shoulder blades reaching toward your hips. This puts you in a stable position and represents a stable shoulder position.

Go through this load-order sequence, burning the checklist into your motor program, so that you can reproduce the same stable position in any situation or environment. This takes time. In the beginning, it might take 20 to 30 percent of your mental RAM just to keep your shoulders in a stable, externally rotated position, your abs on tension, and your back flat. You have to cultivate the mindset that anything that is not a braced-neutral spinal position is probably going to kill you.

To bring awareness to the bracing sequence, I developed a simple and effective method to help coaches and athletes highlight spinal positioning. I call it the two-hand rule.

The Two-Hand Rule

This is a technique to help people see and feel the difference between a braced-neutral position and a broken position, like when they're rounded forward or overextended.

Here's how it works: Take one thumb and put it on your sternum—keeping your hand splayed, palm facing down—and pin your other thumb on your pubic bone, creating two parallel planes. The key is to keep your hands on the same horizontal plane as your ribcage and

pelvis so that any deviation from neutral will reflect in a change in hand position. If your hands move apart, you're overextended. If your hands move together, you're rounded forward.

You can apply the two-hand rule to everyday life positions like standing, sitting, and lying down. It can also be used with basic body weight movements like squatting, walking, or running.

Although we should think of the spine as one contiguous stable structure with the same nervous system running through it, dividing it into parts is a convenient way to spot spinal faults. This is why the two-hand rule is so effective: it brings a heightened sense of awareness to these reference points—pelvis and ribcage—so that you can start to identify where you or your athlete is losing form.

There's just one problem with this model. We miss a key reference point, which is every bit as important as the pelvis and ribcage—the head. In fact, it would be very useful if we had a third hand because there are three main parts to the spinal system: the head (cervical spine), ribcage (thoracic spine), and pelvis (lumbar spine). If any one of these pieces is out of alignment, it's difficult to create optimal positioning.

When using the two-hand rule to bring awareness to the bracing sequence and spotting spinal faults, don't forget that your head is an

essential factor: if your head is out of position—meaning that it's tilted forward or back—you compromise spinal position and lose the ability to stabilize the structures of your primary engines. The Tony Blauer test is a perfect example of this.

Pelvic Floor Dysfunction

Whenever you're in an overextended position, your pelvic floor turns off, which can unleash problems galore, especially among women. For example, one of the things that happens when women jump and land, or more commonly when they're doing double unders—meaning passing a rope under the feet twice per jump when jumping rope—is that they have trouble controlling their bladder. (And this is one of the problems with doing pike double unders.) Fixing this problem is really simple: squeeze your butt to set your pelvis in a neutral position, and then get your belly tight to brace the position. What you'll find is that a lot of the issues caused by pelvic floor dysfunction spontaneously resolve once your pelvis is locked into a neutral position.