

## Balance Training or Balanced Training? Which is More Stable?

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News flash: “Athletes and average citizens are falling over spontaneously and collapsing at the waist on a daily basis! What do we do? There is a world-wide epidemic of poor balance and stability resulting in sprained ankles, buckling knees and, ultimately, severe head injuries!”



**“I’ve fallen on my Bosu Ball and I can’t get up!!!!”**

If this were the case, I could understand why a large majority of the fitness and sports training professionals are incorporating copious amounts of so-called balance training, unstable apparatus training and core stability work. But clearly, this purported stability and balance crisis is not occurring. So what really is going on here? My take on it is that the age-old problem of “a small bit of knowledge becoming a dangerous thing” is at play.

Let’s be honest. People are sheep. There are certainly many more followers than leaders in our society. We like to be told what to do in many instances. What is the latest fashion trend? What car should I buy? How should I invest my money? What is the easiest way to lose weight? I am, however, a follower of the age old process of doing things the ‘right way’, not the popular way. So let’s delve further into the discussion of this balancing act.

### **The Biomechanics of Balance and Stability**

I recently taught a biomechanics course for coaches at the International Coaching School in Victoria, BC, Canada. The text for the course, Sport Mechanics for Coaches, was written by Professor Gerry Carr and offers a concise overview of the fundamentals of sport biomechanics. His discussion on balance and stability offers some important points:

“Stability specifically relates to how much resistance athletes “put up” against having their balance disturbed. The more stable an athlete, the more resistance the athlete puts

up against stable forces. An athlete can be in a balanced position and be as stable as the Rock of Gibraltar. At the other extreme, an athlete can be balanced but be highly unstable. A giant sumo wrestling champion squatting low with both hands on the ground is obviously in a more stable position than a ballerina balancing on the tips of her toes. A child can produce enough force to push the ballerina off balance, but it's unlikely that the same force will do anything but bring a smile to the sumo wrestler's face."



**Stable stance, or simply looking for a lost contact lense?**

What I take from this description is that athletes require skills that allow them to orient their bodies and extremities in a manner which maximize their stability. The ballerina, on the other hand, is balancing and, at the same time, holding an unstable body position. Dr. Carr also goes on to discuss differences in linear and rotary stability, which relate more to body position and technique than it does balancing. Carr's text provides us with what we need to do to enhance stability in sports. Athletes increase their stability when they:

- Lower their center of gravity.
- Increase their body mass.
- Extend their base in the direction of the oncoming force.
- Shift their line of gravity toward and oncoming force.

In case you missed it, Dr. Carr's list did not include training on unstable surfaces. This may be a shock to many personal trainers and strength coaches, but it is the cold, hard truth. If I ever see an athlete teetering and balancing when performing a skill in any sport, with the exception of gymnastics (and I work with elite gymnasts and they don't do any balancing on unstable surfaces), they are more than likely executing that skill improperly. Increasing balance and stability is all about good biomechanics and skill execution.

Sport and human movement should be fluid and effortless. Watching an individual perform balancing exercises on an unstable apparatus is like watching someone with hypothermia (with a severe case of the shakes) try to thread a needle. It is not fluid, efficient or pleasing to the eye. It is a massive over-stimulation of low-threshold, proprioceptive motor units engaging in a frenetic

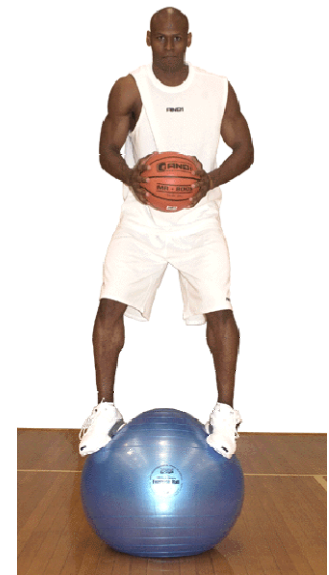
attempt to keep a person upright and off their butt. The adaptation is highly specific and not transferable to dynamic movements. The impact on Central Nervous System fatigue is significant, but without positive adaptations for sports. So, you're working hard, your CNS is getting fried and you aren't getting any faster, stronger or more athletic for your sport. Great tradeoff!

Movement in sports is inherently unbalanced and, to some degree, unstable. Fast, explosive movement requires that your center of mass be placed outside its normal resting place (i.e. inside your stomach). In sprinting, your center of mass is in front of you to assist in the forward driving motion for acceleration and maximum speed. Sprint athletes are unstable in the forward direction. You can be off balance, yet still in control. Throwing athletes such as discus throwers, hammer throwers, cricket bowlers and baseball pitchers all employ techniques that force them off balance to create greater forces and higher velocities. Training that requires athletes to engage in balancing activities works counter to dynamic, explosive human movement.

## **Research on Balance and Stability**

Common sense tells me that training on unstable surfaces does not make sense for healthy athletes. For some reason, unstable surface training made the jump from the rehab setting to the athlete conditioning realm. If that trend continues, look out for the flying ice-bag throw and doing squats with an ultrasound machine strapped to your butt. Common sense aside lets look at what recent research has proven.

In a paper by J.M. Willardson, *Core Stability Training: Application to Sports Conditioning Programs*, he appropriately comments that, "Despite the popularity of core stability training, relatively little scientific research has been conducted to demonstrate the benefits for healthy athletes." He quotes findings by authors of studies such as Vera-Garcia and Behm that indicate that the abdominal region of the body experiences greater muscular 'activity' during exercises on unstable apparatus such as a Swiss ball as compared to a stable weight bench. My response to such findings would be, "Is this type of muscular activity producing a useful adaptation for sports and, for that matter, normal human activities such as walking, standing, jogging and picking up something off the floor?" I know that when I sneeze or cough my abdominal area experiences significant muscular 'activity'. A friend of mine even broke a rib during a coughing fit (not recommended). Following from the pro-Swiss ball perspective, should we then encourage athletes to start smoking and inject them with the cold virus? We could probably get financial support from tobacco companies and the producers of Nyquil with this training approach.



Behm and associates also found out that force output was less on unstable apparatus versus stable benches. Wow – we had to perform a scientific study to determine that outcome! Just go check out your local gym where the fitness crowd is performing dumbbell presses on Swiss balls

with the 10 and 15 pound dumbbells. That's okay – you won't find me on that end of the dumbbell rack anyways. Willardson again appropriately states that while core stability is required for successful execution of sports skills, "very few sports skills require the degree of instability inherent with Swiss ball exercises." He goes on to quote Stuart McGill who indicates that, "Any exercise that channels motor patterns to ensure a stable spine, through repetition, constitutes a core stability exercise." So, from my count, this would include standing, walking, running, jumping, weight lifting, throwing, playing sports and so on and so forth.

Behm and associates also looked at wobble boards and ice hockey performance. For some reason, people associate balancing on a fulcrum board with slipping and sliding on ice. Good thing personal trainers aren't helping design automobiles and snow tires. Behm and associates found out that, "for the most skilled players, skating speed was not significantly related to wobble board balance ( $R = -0.28$ ). Once again, we needed a scientific study to figure that one out! Apparently, common sense is not so common. Willardson goes on to state something that every good coach and trainer should figure out before they provide a training program for hockey players – "The optimal approach to improve balance for healthy athletes might be through practice of relevant skills and movements on the same surface on which those same skills and movements are performed during competition." Hallelujah!!!! I think we are on to something here. You won't get a standing ovation at a personal training conference or even an NSCA conference, but hey, you'll be doing the industry and your clients a service.



**Not sure what's worse – the board or the socks!**

Here's a good one. Stanton and others, as identified in Willardson's article, evaluated Swiss ball training for improvements in running economy and VO<sub>2</sub> max. They found out that Swiss ball training yielded no significant differences in these running performance indicators. Once again... no kidding! The funny part is that they concluded that the best type of core strengthening for running would be, "exercises performed in a unilateral, single-leg support, standing position, with the arms held in a position similar to running." By jove, those exercises sound like – you guessed it – running. You mean to tell me that actually doing the running will condition my 'core' to the demands of running? Get outta here!

Stanton and friends also concluded that, “Improvements in core stability were skill specific.” This is something I have always told my athletes. Performing repetitions on a Swiss ball, Bosu trainer or balance board will improve your stability on these devices. But, there is little to no transference to high speed, forceful and dynamic movements on solid ground, or even ice for that matter. It is similar to using the juggling of balls as a training activity for improving hand-eye-coordination. It will make you better at juggling balls, but it won’t prepare you for catching a 100 mph fastball.

For those who are willing to listen to reason, the best way to address the core strengthening requirements for running would be to:

- Run (yes, it’s that simple).
- Perform the marching, skipping and high knee running drills we should have all learned as young athletes.
- Low amplitude jumps and plyometrics which load the core vertically, similar to running.

Of course, as supplementary exercises, you can continue to perform your med-ball passes and abdominal crunches. Do you need to be ‘unstable’ while doing these types of exercises? There will always be a small degree of balancing going on while performing these types of exercises, but not to the degree that your well-being is at risk (i.e. falling off a Bosu or Swiss ball). A good solid surface should serve you well.



**“Attack of the killer Swiss Balls” or “Functional” exercise?**

In the paper by Behm and Anderson, *The Role of Instability with Resistance Training*, they conclude that, “...both stable and unstable exercises should be included to ensure and emphasis on both higher force (stable) and balance (unstable) stressors to the neuromuscular system.” My problem with this statement is that the term “unstable” needs to be appropriately defined and a magnitude attached. I would take the term ‘unstable’ to mean performing a standing, single-arm shoulder press (on solid ground) over a seated barbell bilateral shoulder press. However, others might conclude that “unstable” means performing a single-arm dumbbell snatch on a Bosu ball

while in a canoe surrounded by alligators. You might go as far to deem the person performing this exercise as both physically and mentally unstable.

Cressey, West, Tiberio et al. also found similar results with athletes performing exercises on stable surfaces outperforming those who trained on unstable surfaces (inflatable disc) in activities such as jumping, sprinting and agility. As with other studies, they determined that force application was not nearly as high on unstable surfaces as compared with stable surfaces. Translation: When your body senses you could possibly fall over, it doesn't allow you to put heavy weights over your head. Thank goodness your body has more sense than most trainers. It's really all about self preservation.

So the research is in and it shows that balancing on different unstable devices yields no significant improvement in athletic ability. I've gone through at least a dozen studies and the results are pretty much the same. I hope more researchers don't continue to waste their time studying this fact of training. But I suspect that proponents of balance training will continue to push their agenda and try to manufacture studies that prove their assertions. It's as though Donald Rumsfeld is pushing the unstable surface training agenda: "They do have weapons of mass destruction, even though we cannot find any proof whatsoever, except these 20 year old barrels that might have once been used for chemical weapons or fertilizer or something like that. But let's invade anyways!" Sounds logical to me!?!?

## **Practical Considerations**

If stability exercises on unstable surfaces only provide specific adaptations that do not transfer to sporting movements, why are we still seeing these concepts pushed by sports and fitness training gurus? One answer is that if "all you have is a hammer, everything looks like a nail." Many trainers are only equipped to address stability issues in their array of training options. It is amazing to find out that many trainers do not know how to perform or properly instruct many basic weightlifting movements including squatting, pressing and pulling. They know very little about proper biomechanics for running, jumping, throwing and lifting. Additionally, they do not properly understand how to train different energy systems. So, what options are left for these types of trainers? "Get on that fancy ball and start balancing for me! When you get better at balancing on that thing, I'm going to start throwing balls at you! Then, I'm going to strap these elastic bands onto you." And the madness continues.

Anyone that has done any conventional stability work knows that one of the side effects is that it really tightens you up. The core abdominal work on unstable surfaces tightens up the abs, hip flexors and lower back muscles. Balancing vertical on Swiss balls, balance boards or Bosu trainers tighten up the groin and the IT bands to a point where chronic groin pulls, abdominal strains and knee pain are not uncommon. The National Hockey League is a prime example of this phenomenon. Groin pulls and abdominal strains are commonplace even though many teams do nothing but "strengthen the core." You don't have to be a brain surgeon to connect the dots and identify the causes of these strains. If you are an athlete that must perform required workouts with all of these crazy stability exercises, make sure that you are supplementing this work with lots of light, static stretching of the hip flexors, glutes, hamstrings, groin and piriformis to bring down the muscle tone in these areas.

## **Where is this Going? Future Directions**

One would hope that this obsession with balancing and stabilizing will be a passing fad, like the hula-hoop, the yo-yo and disco dancing. Unfortunately, as my wife reminded me, all of these fads make comebacks at some point. Even the Rubik's Cube is making a comeback this Christmas season. So, even if our generation comes to its senses in time to prevent more sprained ankles, abdominal tears and head injuries, inevitably our great, grand-children will be bombarded with new stability exercises to help deal with zero gravity on the International Space Station version of the Olympic Games.



**Okay, now the pets have started Bosu training... We're all going to hell!**

So what can we do to improve the situation? The answer is – you guessed it – education. The general public has been duped into thinking that balance is important. Let me rephrase that... They have been duped into thinking “balancing” is important. Of course balance and stability is important. However, the methods currently being used to enhance balance and stability are way off base. Every sporting coach and strength coach must go back to the fundamental biomechanical requirements for different movements and sports. Specificity of training is important. This includes specificity of movement, specificity of load, specificity of velocity, specificity of contraction type, specificity of joint angle, etcetera, and etcetera. However, trying to simulate sporting movements by creating artificial environments and over-thinking the equation in an effort to sell products is irresponsible. Hopefully the masses will be enlightened sooner than later.

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