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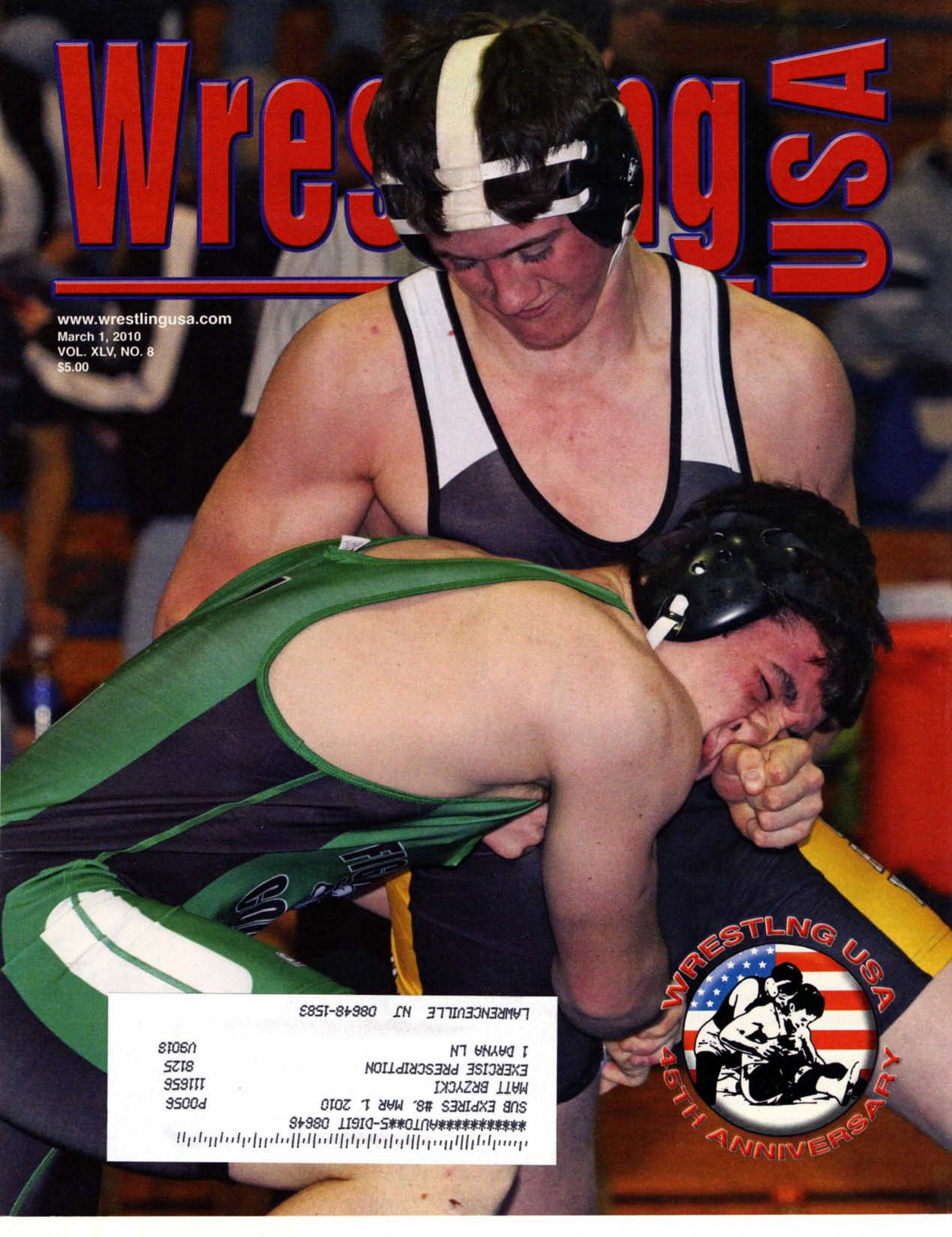

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STABILITY BALLS: GETTING TO THE CORE

By Matt Brzycki

A stability ball – aka a "Swiss ball," an "exercise ball" and a "physio ball" – is a common sight in most gyms and fitness centers. At one time, this large, inflatable ball was used to do bodyweight exercises; more recently, it has also been used to do free-weight exercises (with barbells and dumbbells).

Is it worthwhile to do exercises on a stability ball (or for that matter, on other unstable equipment such as a balance disc and wobble board)? Or is a stability ball just full of hot air? Before an in-depth discussion, it is interesting to look at the origins of the stability ball.

HISTORY 101

Credit for the development of the stability ball is usually given to Aquilino Cosani, an Italian inventor and toymaker. In 1963, he discovered a process for molding large, puncture-resistant, vinyl balls. Originally used as a toy – think of a hopper ball or hop ball – the ball was eventually adopted for use in physical therapy. Legend has it that after seeing the ball utilized in Switzerland, American physical therapists referred to it as a "Swiss Ball."

Up until the 1990s, the stability ball was used mostly by patients to do rehabilitative exercises as part of their physical therapy. Since that time, it has been embraced first by athletes and then by fitness enthusiasts as part of their training regimens.

WHAT THE RESEARCH SAYS

Proponents of the stability ball have claimed that doing exercises on it (and/or on other unstable equipment) will increase the stability of the core (essentially, the muscles that affect the mid-section). Supposedly, the instability of the ball provides greater neuromuscular stimulation and promotes what has become known as "core stability." Additionally, it has been claimed that increasing core stability will improve athletic performance and balance. While all of this sounds really intriguing, what does the research say?

Well, there is little scientific evidence to support the belief that doing exercises on an unstable surface is any better than doing the same exercises on a stable surface. In one study, for example, collegiate athletes were assigned to two groups: One group supplemented their normal conditioning program with lower-body exercises (such as the squat, deadlift and single-leg balance) on an inflatable rubber disc; the other group did the same exercises on a stable surface. There were no significant differences between those who trained on the unstable equipment and those who trained on the stable surface in any of the measures that were assessed including a 10-yard dash, a 40-yard dash and an agility test. Actually, those who trained on

the stable surface had significantly greater improvements in the 40-yard dash.

What about the notion that improving core stability leads to better athletic performance? Research has shown that doing exercises on a stability ball can enhance performance in arbitrary tests of core stability but not performance in athletic endeavors. For instance, a study that involved collegiate swimmers found that training on a stability ball improved performance in tests of core stability but not performance in swimming; and a study that involved high-school athletes found that training on a stability ball improved performance in tests of core stability but not maximum oxygen intake, running economy or running posture. According to Jeffrey Willardson, Ph.D., an assistant professor in the Physical Education Department at Eastern Illinois University, ". . . research has failed to demonstrate a significant relationship or improvement in sports performance consequent to performing exercises on unstable surfaces."

Key point: Exercises that are done on a stability ball are not likely to provide a sufficient stimulus for increasing muscular strength (or size). The reason is that more instability is associated with less force production.

One study examined the effects of performing isometric contractions under conditions that were unstable (sitting on a stability ball) and stable (sitting on a bench). In the unstable condition, the force output during a leg extension was 70.5% less than in the stable condition. In other words, the force output while doing a leg extension on an unstable ball was only 29.5% of the force output while doing a leg extension on a stable bench. Another study compared the effects of doing a bench press in an unstable condition (on a stability ball) and a stable condition (a stable bench). In the unstable condition, the peak force was 59.6% less than in the stable condition. Yet another study compared the effects of doing a squat in an unstable position (on a stability ball) and a stable condition (on a stable surface). In the unstable condition, the peak force was 45.6% less than in the stable condition.

Suffice to say, this is not desirable when it comes to strength training. To get stronger, the muscles need to produce more force not less.

Finally, there is no scientific evidence to support the contention that instability training – on a stability ball or other unstable object (such as a balance disc or wobble board) – improves neuromuscular coordination or balance in another activity that requires some degree of balance. In one study, the researcher found that the correlation between two balance tasks was "little more than zero." In another study, researchers looked at six tests of static and dynamic balance and found that the abilities that supported one test of balance were separate from those that supported another.

Therefore, any endorsement for using a stability ball appears to be almost entirely anecdotal without much in the way of scientific proof. As a result, the use of a stability ball for the purpose of improving athletic performance, strength or balance seems rather dubious.

QUESTIONABLE APPLICATIONS

The popularity of the stability ball has given rise to a number of applications that are very alarming. This includes standing on a stability ball, doing unassisted squats on a stability ball (sometimes with a barbell held across the shoulders) and jumping from one stability ball to another stability ball.

Impressive? You betcha. Safe? No way.

At best, these and other similar exercises/activities are nothing more than a horrendous waste of time; at worst, they are extremely unsafe with a high risk of injury.

As Tom Kelso, an exercise specialist with the St. Louis Metropolitan Police Department and a 23-year veteran of the collegiate strength-and-conditioning field, candidly states, "Potential injuries arise when the use of a stability ball is taken too far such as the attempt to develop balance/stability. Standing or sitting on a stability ball while lifting a barbell or dumbbell is unnecessary and outright dangerous. I have seen this type of training and, quite honestly, it makes me think that if I had to do it all over again, I would have become an orthopedic surgeon . . . with no shortage of work or wealth." Dan Riley, who spent more than 25 years as a strength coach in the National Football League, adds, "I cannot see how squatting on a ball can be considered a safe and productive activity for any athlete."

Coaches take note: If you have your athletes perform questionable exercises/activities on a stability ball, you must be prepared for the consequences in the event that an injury occurs. Are you prepared to explain to a wrestler's parents and/or your athletic director why you had an athlete do the shoulder press on a stability ball which resulted in him losing his balance and control of a dumbbell that struck his mouth and chipped a tooth? Or why you had an athlete do unassisted squats on a stability ball with a barbell across his shoulders which resulted in him falling and wrenching his lower back? Or why you had an athlete leap from one stability ball to another which resulted in him tumbling to the floor and sustaining a head injury?

Here is something else that many individuals fail to consider about a stability ball: Anything that is inflatable has the potential to burst. Case in point: In September 2005, a man was about to do a bench press on a stability ball with a pair of 75-pound dumbbells when the ball exploded. He broke both wrists and one forearm and injured both shoulders. The man said that he could not use either arm for six months after the accident. Furthermore, he incurred five surgeries and more than $100,000 in medical bills. About two years after the accident, he and his wife filed a lawsuit, contending that the gym (a YMCA) failed to maintain safe conditions.

If you think that any of this rarely happens, guess again. The Federal Trade Commission's Bureau of Consumer Protection estimates that more than 870 individuals have been injured using stability balls since 2004.

And for what reason?

Is it to improve balance? Stand on a BOSU ball with one leg while juggling tennis balls to the tune of Born to be Wild and you will get very good at standing on a BOSU ball with one leg while juggling tennis balls to the tune of Born to be Wild and nothing else. The balance that is required for one activity is not related to the balance that is required for another.

Is it to make exercises/activities more "functional"? How exactly is jumping from one stability ball to another a "functional" exercise/activity? Why is doing a bench press on a stability ball perceived as "functional" but doing the same exercise on a stable bench is not? Moreover, is there any exercise that is truly "non-functional"?

Is it to make training more "specific"? What sport or activity is "specific" to squatting on a stability ball with a barbell held across the shoulders? While on the subject of specificity, name one sport or activity that is played on a surface that in any way resembles a stability ball. It most certainly is not wrestling. To quote the researchers in one of the studies that was mentioned earlier:

"Whether some of these circus-type maneuvers provide specific crossover training adaptations to sport is still under debate and demands further investigation."

Doing exercises on a stability ball has not been as widely accepted as some might think. Strength coaches at the scholastic, collegiate and professional levels have expressed their reservations and condemnations of the stability ball.

Doug Scott, the strength and fitness coach at The Pingry School (NJ) states, "Placing a 'weak' or 'unstable' body part in an environment that is unstable – such as when exercising on a stability ball or balance disc – is like teaching a non-swimmer to swim by throwing him in the deep end of a pool; that is to say, the outcome will not be a favorable one. Athletes need to understand that their body will become more stable by developing strength through traditional – and stable – means."

Michael Bradley, a strength coach at Florida State University and a 20-year veteran of the collegiate strength-and-conditioning field, says, "If instability is what you are after, why not lift rocks instead of dumbbells and barbells? Of course, that is ridiculous. The fact of the matter is that in order to stimulate maximum gains in strength, you must use a relatively heavy weight and train with it using a high level of intensity. Anything that distracts you from doing so – such as training on unstable equipment – will not produce maximum gains. And to what end? Where is the payoff for all the risk and wasted time?"

Coach Riley states, "I do not advise using a ball as a bench or platform while lifting meaningful weights with the purpose of stimulating maximum strength gains. I prefer the opposite. I want a very stable foundation to allow our players to focus on the act of performing the exercise without any external inhibitors that might limit the amount of weight they use and ultimately the potential strength gains to be made in the muscles we are trying to target."

THE LAST REP

In keeping with its original intent, a stability ball can be used for rehabilitative exercises. Using a stability ball can also provide variety to workouts, assuming that the exercises/activities can be done safely and effectively.

Just be mindful that a stability ball is ineffective for improving athletic performance, strength and balance. And any exercise/activity that carries a high risk of injury should be avoided at all costs.

Editor's Note: Matt Brzycki has authored, co-authored or edited 17 books on strength and fitness including four that are devoted to wrestling. His latest book is Youth Fitness: An Action Plan for Shaping America's Kids.