Starting Strength

Hiding Behind Smokescreens

by

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An increasing number of strength coaches are delving into the "therapy" side of practice through additional education in anatomy, human movement, and injury management. Conversely, many young therapists are beginning to recognize the importance of strength training and the principle of progressive overload for long-term adaptation. These "hybrid" coach-therapists have a lot of potential, but many of them introduce unnecessary complexity by inappropriately blending the two approaches for general strength trainees.

There have been countless repetitive articles published online in the past few years examining the basic barbell lifts and other movements through the "therapist" lens, usually with a title along the lines of "*Why Everyone Must (insert movement here) Differently.*"

And of course, it is true that we are not identically-built creatures. We do have a degree of variation in our bone structure and muscle attachments (our *anthropometry*), and these differences make "correct" squats and deadlifts look slightly different for different people. Critics often claim our approach to teaching the basic barbell lifts is "dogmatic" or "absolutist" because, of course, "not everyone deadlifts the same way." Look, people: ***we know***. We've never said that "everyone deadlifts the same way." What we have created is a basic *model* for the movement pattern that simultaneously accounts for anthropometric differences while accurately and reliably *predicting* the way different people move barbells against gravity. This predictive value lends support to the validity of our model and teaching method.

The problem with these articles is that they typically break down a movement like the deadlift by individually examining the function of each joint and muscle group in the overall movement, and then using this to build an argument for how every single trainee is such a unique "special snowflake" that every aspect of their technique, exercise selection, and programming must be individualized. Otherwise, of course, we are using a "cookie-cutter" approach to "force-feed" certain movements and put "square pegs into round holes." This is a gross misrepresentation of our approach, but let's set that aside for now.

They take the argument even further, to suggest that the strength, function, mobility, stability, or other such characteristics of each joint, ligament, tendon, and muscle along the kinetic chain must be individually screened for "dysfunction" before even considering putting a barbell in a new trainee's

hands. It has even been argued that a failure to *universally* perform this screening in new trainees (including in completely healthy, asymptomatic people) represents malpractice or negligence on the part of the coach!

Amazingly, we have taught thousands upon thousands of people to perform the basic barbell movements safely, quickly, and effectively with *zero* pre-screening, and *zero* complications resulting from the teaching methods. Unless injured or too physically weak to perform the full lifts, everyone – including the most special of snowflakes – can learn to squat below parallel, press overhead, and correctly pull a barbell off the floor on day 1. They perform the lifts in accordance with our basic models, which *by definition* account for their individual anthropometric differences. But for the sake of argument, let's examine this "screening" idea from the perspective of medicine, where we screen patients for a number of diseases throughout their lives.

At birth, we screen all newborns for dangerous conditions like congenital hypothyroidism, phenylketonuria, and a few others. On the other hand, we *don't* routinely screen for thousands of other congenital conditions, including muscular dystrophy and color blindness. We also screen all adults for colon cancer and high blood pressure, but we don't screen *anyone* for pancreatic, brain, or ovarian cancer. Why is this? How do we decide what diseases to screen for, and who to screen?

There are a few basic principles at play here. While screening can provide varying levels of benefit, the tests also have costs and risks. Because of this, Wilson & Jungner proposed a few criteria to ensure the effective use of resources when it comes to population-level screening:

1. The target condition must **be an important problem with sufficient prevalence** in the population of interest. We therefore don't bother screening for Progeria, because it only occurs in about 1 of every eight million live births.

2. There must be a **simple, sensitive, valid, reliable, and (ideally) economical screening test** that detects the condition at **an early stage**. We therefore don't bother screening for pancreatic cancer, because we have no tests that meet these criteria. Admittedly, the economical point is controversial, because it is problematic to compare the cost of testing to an arbitrary monetary value of the additional years/quality of life (the so-called "Quality-adjusted life year") gained by successful screening.

3. There must be a **cost-effective treatment** available that, when provided at this early stage, results in **substantial reduction in long-term harm**. We therefore don't bother screening for most progressive, incurable diseases.

Once we've decided that screening is worthwhile, how does this process actually work? After we identify our population of interest, we apply our chosen screening test to detect individuals who need further evaluation. This test should be highly *sensitive* for the target condition – in other words, it should ideally catch everyone with the condition, but usually comes at the cost of many false positives too. Therefore, we subsequently perform a more *specific* confirmatory test to weed out the false positives after the initial screen, leaving us with those "true positives" who actually need treatment.

So let's return to the idea of musculoskeletal / "movement" screening assessments for all trainees before teaching the barbell lifts. Proponents of the idea argue that, because variation exists in human anatomy and anthropometry, *everyone* should be screened for "restrictions," "dysfunctions," or other such musculoskeletal anomalies prior to touching a barbell. These screening techniques might include standardized approaches like the "Functional Movement Screen" (FMS), or it might just involve physical exam techniques to assess various joints, muscles, or movements.

These are rather bold recommendations, with very little (more like zero) evidence to support them. So let's try applying the above criteria to see whether their recommendation of population-wide screening seems justified.

1) Is there a sufficient prevalence of asymptomatic musculoskeletal variants that result in an unacceptably high risk of injury from learning and performing the basic barbell lifts?

The coach-therapists would argue that these problems are rampant in the general population, and they simply must be detected prior to teaching the lifts. Unfortunately there is simply no evidence to support this assertion, and practical experience argues against it. In fact, the current data suggests that your biggest risk for injury while training stems from dropping a weight on your foot [1]. Regardless of public fears and misconceptions, the evidence shows weight training to be a remarkably safe activity, particularly when compared to other sports and activities [2]. And anecdotally, our coaching practice with many thousands of trainees from all ages, ability levels, and training histories also suggests that this is not the case.

Of course, practitioners who make a living evaluating and treating patients with pain or injuries will be likely to disagree with this, because of how frequently they see these musculoskeletal anomalies in their selected patient population. This is analogous to orthopedic surgeons erroneously believing that "squats are bad for the knees" or "deadlifts are bad for the back," because their clinics are typically full of patients with aching knees and painful backs. It is easy to fall prey to the cognitive error of *anchoring* – to latch on to the first piece of information you receive and prematurely assume causation where only correlation exists, and then inappropriately generalize to the asymptomatic general population.

2) Are the proposed screening tests (physical exam maneuvers, FMS, etc.) sensitive, valid, reliable, and economical means to detect these abnormalities in the target population?

There is little evidence to support this assertion. Most standard musculoskeletal physical exam maneuvers have no clear clinical significance in an asymptomatic subject, and many have poor sensitivity *even in symptomatic individuals*.

Consider the FMS, for example. In Division 1 athletes it does not predict overuse or non-contact musculoskeletal injuries (e.g. those from training or sport unrelated to getting clipped by a competitor) [3]. This tells us the FMS is not sensitive enough to predict injury in this context. Taken a step further, if this extensive test that claims to evaluate a person's "mobility," "stability," and overall motor control through fairly demanding movements cannot identify those who *are* at higher risk for injury (while catching some false positives), then how likely is it that a more direct test focusing on a *single joint* will capture all the true positives (with a few false positives)?

Simply put, screening for an arbitrary amount of ankle dorsiflexion (which, to be clear, *has actually been recommended*), has absolutely no bearing on whether or not a trainee will ultimately be able to perform a correct deadlift. This is because the deadlift requires a minimal amount of ankle dorsiflexion, so "insufficient ankle mobility" is not an important problem with sufficient prevalence to bother screening for in this context (failing criterion #1). It is therefore a waste of time and should not be performed at all.

Again, in an ideal world we'd have a sensitive screening test that reliably identifies issues for which there is an early treatment that produces significant benefit (e.g. a cure or addition of quality years of life). At present, there is no evidence suggesting that any currently available movement screen, physical exam, or other such maneuvers fulfill these criteria in the context of asymptomatic barbell trainees – **unless the screening test is the performance of the barbell lift itself**.

3) Assuming criteria #1 and #2 are met (and they aren't), are there specific interventions that, when applied early, result in a substantial reduction in long-term harm from barbell training?

This question is a bit trickier. Since human anthropometry cannot be changed, any treatments suggested to "correct" supposed anthropometric issues would obviously not be fruitful. Many of these coaches recommend modified/individualized exercise prescriptions based on anthropometric observations, or recommend batteries of "corrective exercises" to fix supposed deficiencies identified by their screening tests, *even in asymptomatic individuals*. Trainees enjoy being treated like "special snowflakes," are impressed by complexity, and often fall prey to these approaches out of misplaced fear of catastrophic injury. This is problematic for several reasons.

After taking trainees through the screening process, these coaches make treatment recommendations based on a positive test. Recall that screening tests are designed and applied to take advantage of *high sensitivity*. This means they should detect all "true positives," but at the cost of many "false positives" that we must subsequently weed out using a more *specific* confirmatory test. Therefore, making treatment recommendations based on a positive screen is premature and inappropriate.

To provide a concrete example: laying someone on a table and flexing their leg to screen for "inadequate hip mobility" (e.g., the Scour test) may detect a true mobility issue, but it may also show a false positive result that has no relevance to correctly performing the deadlift (i.e. low specificity). It should be obvious that the only way to find out for sure is to attempt to perform the lift – in which case, why did we spend time screening at all? *When properly coached and loaded, the barbell lift simultaneously represents the screening test and the confirmatory test for all of its pertinent musculoskeletal issues.*

The false positive problem is why confirmatory testing is needed. And when it comes to performing the barbell lifts, simply *teaching the lift* provides confirmation as to whether practically significant structural problems exist. Unfortunately, the coach-therapists perform a battery of screening tests on multiple joints, muscles, and movements (despite their failing all 3 screening criteria), then jump straight to "corrective exercises" or modified exercise prescription.

The blatant omission of the "confirmatory" step results in a substantial risk of wasting time inappropriately "treating" a false positive case – someone who might, with *proper coaching*, have been able to perform the lift perfectly on day 1. For example, someone who has difficulty with achieving sufficient hip flexion in the deadlift might simply need to turn the toes out and externally rotate the femurs a bit more than someone else – and this might be all that's needed to get the job done. Instead, they end up avoiding the exercise altogether and opting for variants that involve less muscle mass, less effective range of motion, and have lower potential for loading and trainability. Alternatively, they might waste hours, days, or months performing "correctives" that often 1) look nothing like the barbell lift (i.e., low task specificity), and 2) may not be treating the true problem – *the absence of proper coaching* – at all.

So, based on these criteria, universal musculoskeletal screening for asymptomatic general strength trainees prior to learning the barbell lifts does not appear to have strong justification. The solution is simple, but challenging: proper coaching and loading of the movements, with minor adjustments as needed based on observations during the coaching process. We'll move on to discuss the "Corrective Exercise Problem" in further detail in the next installment of this article series.

References

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