



## THE CORRECTIVE EXERCISE TRAP

**NICK TUMMINELLO, NSCA-CPT, JASON SILVERNAIL, DPT, DSC, CSCS, FAAOMPT, AND BEN CORMACK**

*The opinions expressed by the authors are their own and do not represent the official policy or position of the NSCA, the United States Army, the Department of Defense, or the United States Government.*

**W**hen it comes to programming safe and effective exercise for clients, the corrective exercise approach has been a topic of controversy and confusion among fitness professionals. This article will address common approaches to exercise programming for clients by 1) defining and delineating the differences between correct exercise and good personal training practices, 2) examining the common beliefs/misconceptions about corrective exercise, and 3) present practical guidelines for exercise prescription that any personal trainer can put into practice immediately.

In order to address these topics properly and make this article as comprehensive as possible, it has been organized into the following sections:

- Section 1: What is Good Personal Training?
- Section 2: Does Corrective Exercise Work?
- Section 3: Practical Guidelines for Individualizing Exercise Prescription
- Section 4: Practical Guidelines for Safe and Effective Program Design

This article will provide scientific and well-founded perspectives and practical, principle-based guidelines for exercise prescription

the fitness professional can use immediately and universally to find a safe and individualized training program. It will also provide guidelines to help fitness professionals avoid getting caught up in the trap of conflicting studies on the topic of corrective exercise.

### SECTION 1: WHAT IS GOOD PERSONAL TRAINING?

From a programming perspective, one of the many jobs of the fitness professional is to help clients and athletes find safe and individualized training programs aimed towards achieving their health, fitness, physique, and performance goals. The fitness professional does this by 1) providing careful observation, constant guidance, and feedback (i.e., coaching) on exercise execution, and 2) individualizing exercise prescription based on the client's or athlete's ability and medical profile (i.e., medical conditioning, injury history, preferences, etc.). Doing so is considered to be using good personal training practices because the personal trainer is adhering to general exercise principles of physiology and biomechanics while meeting the specific needs of the client, also known as client tailoring.

Client tailoring is a type of feedback that is "corrective" in nature. An example includes coaching a client to avoid allowing their knees to cave into a valgus position when squatting by performing squats while pushing against a mini-band loop that is around the knees, acting to "correct" technique and address execution errors in client performance. Specific training can also include building balance, strength, and performance in the post-rehabilitation environment after medical care is complete to improve tolerance to stress loading and reduce injury risk for an area that the client

has injured in the past. Good personal training practices correct client performance based on a common standard of exercise biomechanics and physiology with tailoring for the client's performance and needs.

Good personal training is universal; that is, the principles behind a good training program should be immediately recognized by other fitness professionals who have the same scientific background. Recognition of these principles is based on the underlying science, not on a particular school of thought. A client on a good personal training program could take that program anywhere in the world, and any fitness professional would immediately recognize it as a good program based on the foundational principles of exercise science.

### **CORRECTIVE EXERCISE VERSUS GOOD PERSONAL TRAINING**

What does the term “corrective exercise” mean? Since good personal training practices are by nature already “corrective,” what value is there in attempting to market or teach a concept of “corrective exercises?” In other words, since providing constant guidance and feedback (i.e., client tailoring) on exercise execution is “corrective” in nature (e.g., telling a client to avoid allowing their knees to cave in when squatting or having someone perform squats while pushing against a mini-band loop that is around their knees) some may wish to argue that one has to be “corrective” in order to be an effective fitness professional. Therefore, corrective exercise and good personal trainer practices are essentially the same thing. However, this is a self-defeating argument, in that, if good personal practices are by nature already “corrective,” there is no need to use the term “corrective exercise” to begin with. To put it another way, it defeats the purpose of using the specialized term of corrective exercise to describe practices that are already inherent to using good personal training practices that are foundational to the fitness professional.

On that same token, although arguing that corrective exercise practices are just good personal training practices may sound good to say, logically it also eliminates the need to give oneself the different professional designation of “corrective exercise specialist.” Also, if one wishes to argue that one cannot draw the line between what is good personal training practices and what is corrective exercise practices because it is an impossible gray area, it is important to note that this argument is also logically flawed because it is internally contradictory. In that, one is using the distinct delineation of “corrective exercise” to describe and promote certain practices one specializes in, one cannot then turn around and argue that these same practices exist in a gray area; therefore, they cannot be distinctly delineated. One cannot have it both ways and remain logically consistent, because as soon as one uses a different and distinct delineation of corrective exercise, one is utilizing practices that are different and distinct from good personal practices universal to the fitness professional.

With the above realities in mind, corrective exercise practices cannot be the same as, or exist in a gray area with, good personal training practices, and therefore are indeed fundamentally different than general exercise practices because they each utilize a different decision-making process for exercise prescription. In other words, since good personal training practices and corrective

exercise practices both utilize range of motion exercises, strength exercises, coordination exercises, etc., corrective exercise isn't as much about the exercises one performs, but about why one prescribes the exercises one does, along with why one takes a particular programming direction.

Put simply, corrective exercise is a system of exercise programming that attempts to correct performance of specified activities based on a specific structured evaluation model to predict injury or poor performance if the model's performance goals are not met and the client's performance does not fit the model's definition of “normal” or “optimal.” In other words, good personal training practices correct performance based on accepted biomechanics and exercise physiology tailored to the client; whereas, corrective exercise corrects performance based on an evaluation model. While they both might be aiming to accomplish similar things, they are clearly different based on the performance standard.

The corrective exercise approach is based on the premise that even if the fitness professional optimally applies the principles of general exercise specific to the client tailoring, they are 1) failing to address the so-called underlying “dysfunctions” that are often claimed to lead to pain and increased injury risk, or are 2) reinforcing these so-called dysfunctions or even causing them to worsen. For example, these dysfunctions might be static postural alignment, a limitation in a movement of a body segment, or a quality judgment about client movement. This focus is demonstrated by the emphasis some fitness professionals place on the use of a formalized evaluation (i.e., assessment or screening) procedure that is based on some preset standard of what is considered to be “normal.” This allows them to first identify the areas that do not meet the standard so they can write a program to “fix” those weak areas. In other words, corrective exercise practices are founded on the belief that properly applying good personal training practices is insufficient for finding a safe and individualized training direction. Rather than universal, corrective exercise is exclusive—that is, the principles behind corrective exercise will only be immediately recognized by other fitness professionals if they subscribe to that particular set of principles. Recognition of these principles is based on experience with a particular school of thought.

Since good personal training and corrective exercise practices both use exercises to improve performance, corrective exercise is not as much about which exercises are performed but about why a personal trainer prescribes certain exercises and why they take a particular programming direction. In short, the idea of corrective exercise is really about the particular evaluation procedure—the performance standard used to drive exercise prescription decisions. The danger here is that many fitness professionals might end up making their training process more about a formalized evaluation procedure and less about good personal training.

For the purposes of this article, corrective exercise uses an evaluation procedure to predict injury risk, identify client problems, address these problems through specific means, and help structure programming to improve performance. If the evaluation procedure produces exercise programming that does

those things, then corrective exercise might be a valuable concept. However, do the evaluation procedures perform as advertised?

### SECTION 2: DOES CORRECTIVE EXERCISE WORK?

There are several different approaches to corrective exercise, many of them are mutually exclusive. Do these approaches accomplish the goals they claim to reach? The following will discuss what the basic science and research say about corrective exercise in regards to injury prevention, improving athletic performance, and identifying relevant dysfunctions in posture, movement quality, or body function.

#### INJURY PREVENTION

It is commonly believed that the use of a formalized evaluation standard helps predict individuals at risk of future injury and provides an individualized program to reduce injury risk by improving performance on the standardized evaluation. As noted by Bahr, tests purporting to predict injury must go through three steps (2):

1. Identify risk factors in a prospective study design and establish cut-off values.
2. Validate the predictors and cut-off values in several different groups in separate studies.
3. Demonstrate the value of the screening and intervention program through a randomized controlled trial.

According to Bahr, several studies have achieved the first step, a few have achieved the second step (with mixed results), but there have been no successful examples to date of interventions completing all three steps on a scale applicable to training (2).

That said, much of the discussion of corrective exercise approaches begins and ends at the first step, then it is often assumed that not only will those same factors be validated across different groups, but that the cut-off scores and proposed intervention methods will all be validated as well. For example, imagine a small study on a corrective exercise approach that finds that clients playing amateur volleyball who score a four out of five technique points (as measured by their proprietary system) on a pull-up to be at increased risk of injury in the next season. They have achieved the first step of the process. It would be incorrect to then assume that the same predictor (pull-up test) and cut-off value (four out of five points) will be valid for other groups (beyond clients who play amateur volleyball) because they would be assuming success at the second step. Furthermore, it is often assumed that the particular corrective process that they advocate to move clients to a score of five out of five would be proven successful in preventing injuries across those various groups, which is assuming success at the third step.

#### ATHLETIC PERFORMANCE

Beyond injury prevention, it is commonly believed that a corrective exercise approach improves athletic performance. Although,

there is research showing that the deep overhead squat, in-line lunge, active straight-leg raise, and rotary stability tests were significantly correlated to all performance tests, the preponderance of the limited data on these approaches to date does not support that claim (28). Training in a corrective system can improve the performance on the particular test battery one uses as an evaluation but does not generally translate to improved athletic performance (17,29,35,37). Additionally, an athlete who is aware of the test criteria will do better on the assessment than others, independent of their injury risk or performance level (12). In short, the body of research in this area to date demonstrates that corrective exercise improves specific testing performance but does not necessarily transfer positively to athletic performance.

#### IDENTIFYING AND ADDRESSING “DYSFUNCTIONS”

Corrective exercise approaches are often utilized to identify relevant dysfunctions in posture, movement quality, or body function. The following will address some relevant research for each of these three elements as well as introduce the “nocebo effect.”

Before delving into the three following sections, it is important to note that in order to spot a physical flaw that needs to be corrected, one must begin by having a reliable measure of whether or not it is actually problematic in the first place. In this way, one can know that this “physical flaw” is in need of actual correction, rather than just being a general variance in human structure, posture, or function. This is where being informed by the available research data is exceptionally valuable—it can help the fitness professional to know what may or may not prove to be reliably problematic. This is not just from looking at a singular research study to validate a given evaluation model, but by examining the wider body of evidence and taking note of the trends that emerge (24). Of course, one can find research that either falsifies or validates a point quite easily, but looking to see if the findings are replicated in similar studies often provides one with a greater degree of confidence in the results. With the plethora of articles promoting corrective exercise, the minimum requirement of the discerning fitness professional should be that potential physical flaws or deficits in need of correction are backed up by clear evidence that they have relevance in the first place.

#### Postural Dysfunctions

“Poor” posture is often said to be causative of pain and injury, putting the body in positions that create an abnormal load to tissues or affect one’s movement. There are many theories regarding posture and pain related to areas of the body that suffer common injuries. Fortunately, this is an easily testable premise, as research can simply take a group of people in pain and a group of people not in pain and compare them. This is called a case controlled study and looks for differences or risk factors between the two groups. In this case, the prevalence of an abnormal posture in the group that is suffering from a certain pain should be quite easy to spot and validate the need for some type of correction.

A common postulated postural dysfunction is upper crossed syndrome. Upper crossed syndrome is an often cited potential risk factor for pain and movement dysfunction in gym goers (33). Those with upper crossed syndrome often develop muscular imbalances between long and weak posterior shoulder girdle muscles, such as the rhomboids and lower trapezius, and display tightness in the anterior muscles, such as the pectoralis major and minor (20,33,36). This dysfunction can lead to the development of an increased thoracic kyphosis and forward head posture with the effect of increased pain issues around the shoulder and neck (20,33,36).

In 2005, a study looked at both forward shoulder posture and forward head posture to see if they were associated with shoulder impingement issues (27). The researchers found no difference between the head and shoulder positions of those in pain versus those without, and found no evidence to support posture or muscle imbalance as being causative or associated with shoulder impingement (27).

A similar study from 1995 looked at whether posture was involved with shoulder overuse injuries, and again the researchers found no significant differences between the healthy and injured groups (15). Sixty matched for age and gender participants (30 patients and 30 controls) were studied (15). Examining scapula protraction, rotation, and mid-thoracic curvature revealed no significant difference between the two groups (15). The researchers concluded that posture's effect on shoulder injury was inconclusive (15). Also, a 2016 systematic review looking at whether thoracic spine posture is reliably associated with shoulder pain, range of motion and function found that resting thoracic posture is similar in people with and without shoulder pain, and that although greater shoulder range of movement can be obtained in an erect thoracic posture, increased thoracic kyphosis may not be a key contributor to shoulder pain (3).

Another study looked at the association between cervical spinal curvature and neck pain (16). For this study, the subjects were divided into two groups: those with neck pain (N=54) and those without (N=53) (16). The researchers looked at the global curvature of the spine and also the segmental angles and then related them to the neck complaints (16). The average segmental angle of those suffering with neck pain was 6.5° and 6.3° for those without (16). No correlation was found between clinical characteristics of the pain for global curvature or segmental angles (16).

This brings into question the hypothesis that upper body posture is reliably associated with shoulder and neck pain and therefore, the need to "correct" a proposed postural "distortion." Posture and muscular imbalance appears to be a normal component of human variation and more likely depends largely on the type of activities performed.

The proposed technique for the correction of postural deviations is to strengthen the "longer, weaker" muscles and stretch the "shorter, tighter" muscles. Although a stretching and

strengthening approach to shoulder exercise had an effect on certain parameters tested by Wang et al., the resting scapular position or scapula posture remained unaltered (48). In a review of resistance exercises for postural alignment, Hrysonallis and Goodman found that no objective data was present to support the concept that exercise will lead to changes in postural deviations and it is likely that they are of insufficient duration and frequency to offset daily living activities (22).

Another common postural issue is lower crossed syndrome. This involves pelvic and lumbar posture being altered by muscular imbalance of the anterior and posterior muscles of the region. Tight hip flexors have been proposed as a risk factor for an increase in the lordotic curvature of the lumbar spine via an anterior tilt of the pelvis. This increase in lumbar curvature has been proposed as a causative factor in the development of lower back pain and a decrease in abdominal muscle function due to an increase in abdominal muscle length.

The fitness professional must ask two questions. Firstly, does a decrease in hip extension and pelvic tilt have the proposed effect on lumbar curvature? And, secondly, does an increase in lumbar curvature have an association with lower back pain?

The first question was explored by Heino et al., who looked at the range of movement of hip extension and three clinical parameters of postural alignment (18). These were standing pelvic tilt, standing lumbar lordosis, and abdominal muscle performance. Their conclusion was that the hypothetical correlation between these three parameters and postural alignment needed to be reassessed due to the proposed factors being unrelated (18).

Murrie et al. examined the correlation between the degree of lumbar lordosis and back pain (32). They found no difference between the degree of lordosis in women with back pain and those without (32). A study into the lumbar spine curvature of Turkish coalminers found that while the occupation of coal mining may affect incidences of back pain this was not determined by the curvature of their lumbar spines (42). Nourbakhsh et al. discovered an association between muscle weakness and endurance and lower back pain, but could find nothing to associate lower back pain with lumbar lordosis, pelvic tilt, or length of abdominal muscles (34). A systematic review into sagittal spinal curvature and health by Christensen et al. looked at 54 studies that met the inclusion criteria (6). They found no strong evidence for an association between spinal curvature and health including spinal pain (6).

An association was found between low lumbar lordosis and those suffering from chronic low back pain, but this was not accompanied by changes in pelvic tilt and does not fit with the model of hip flexor tightness causing a change in the anterior rotation of the pelvis (5). Laird et al. performed a systematic review and meta-analysis comparing the lumbopelvic kinematics of people with and without back pain (25). Those suffering from back pain did have reduced lumbar range of motion and slower movements, but displayed no significant difference in lumbar

lordosis angle or the angle of pelvic tilt (25). The current body of evidence points to a lack of association between hip extension range of motion and lumbar lordosis and also fails to associate an increase in lumbar lordosis and lower back pain. In fact these proposed “problems” may be the rule and not the exception.

Herrington studied the anterior pelvic tilt of an asymptomatic normal population and found that 85% of men and 75% of women displayed an anterior pelvic tilt (19). In this study, only 9% of males and 18% of females had a neutral pelvic position; therefore, an anterior pelvic tilt would be the most likely posture for someone to present with during any postural analysis and this does not seem to be associated with lower back pain. Furthermore, there are also some serious methodological issues associated with determining whether an individual has an anterior pelvic tilt. Using bony landmarks to identify pelvic orientation, as is the popular method of assessment, may be affected by normal morphological variations, which could significantly influence the results of any basic assessment (38).

Muscular imbalances may also be normal and activity dependent. For example, Australian Football League players have been shown to display significantly greater cross-sectional areas of the psoas muscle ipsilateral to their kicking leg while the quadratus lumborum was larger on the contralateral side (21). This asymmetry was unrelated to injuries suffered. Additionally, cricket fast bowlers suffering from back pain actually had more symmetrical muscle function than those who displayed asymmetrical muscle function (14). This data seems to suggest that there may not be a reliable or predictable link between posture and pain. Because of this reality, fitness professionals should demand a very high level of evidence and validation of proposed theories that drive practice.

### **Movement Dysfunction**

This is another opportunity to demonstrate how not all scientific evidence is created equal, and highlights the difference between looking at a single study compared to looking at what the preponderance of evidence says on a subject. For example, the results of one 2013 study suggest that an injury prediction algorithm composed of performance on efficient, low-cost, field-ready tests can help identify individuals at elevated risk of noncontact lower extremity injury (26). However, the findings of a 2015 systematic review of the current literature on such an injury prediction algorithm do not support the predictive validity, and expressed that methodological and statistical limitations identified threaten the ability of the research to determine the predictive validity (11).

Additionally, the squat movement is commonly used to identify potential movement dysfunctions based on how an individual is able to perform the movement while adhering to a given standard of “ideal” foot position, stance width, depth, and torso angle. However, research in both eastern and western populations has not only found normal variations in femoral neck angle, but also asymmetrical differences between the left and right sides of individuals (23,50). This is in addition to normal anatomical

variations in the structure of the hip acetabulum, which can influence individual squat performance (8,49).

The normal anatomical variations of the hip joint structure, in addition to the length of one’s torso, femur, and tibia, demonstrate that an optimal squat is individualized. Therefore, there can be a variety of foot positions, stance widths, depths, and torso angles. Although one may wish to use a standardized squat position for everyone in order to create a baseline, such a baseline may not be possible in exercise prescription due to anatomical variation in human skeletal structure.

### **Body Function: Core Stability**

Motor control exercises are designed for the individual to learn how to preferentially contract the local stabilizing muscles of the spine (e.g., multifidus, transversus abdominis, internal oblique) independently from the superficial trunk muscles (e.g., erector spinae, rectus abdominis). They are commonly prescribed by fitness professionals to improve “spinal stabilization” or “core stability,” especially for those with low back pain (LBP).

Contrary to common belief, the current body of scientific evidence (which consists of two systematic reviews) demonstrates that there is nothing special about using motor control exercises as a means to prevent or reduce back pain (30,41). One study of note, which was a randomized controlled trial study that also involved subacute or chronic low-back pain patient subgroups found that motor control exercise and general exercise (aimed at improving the muscular strength of the lumbar and pelvic region and legs) appear equally effective at reducing LBP in the patient subgroup (40). The researchers concluded that “the contrast between both types of intervention did not bring additional value to the shared effects,” (40). Additionally, it is important for the fitness professional to note the following statements from the researchers of this study: “It is possible that the type of exercise treatment is less important than previously presumed; that the patient is guided to a consistent long-term exercise lifestyle is of most importance. The results of our study support previous findings that exercise in general, regardless of the type, is beneficial for patients with [non-specific low back pain],” (40).

These above research results are extremely positive and empowering to the fitness professional. In that, they demonstrate that many fitness professionals who may have added additional steps and potential complications to the programming process by making it less about using basic principles of good personal training and more about corrective exercise evaluations have done so simply because of a common undervaluing of the benefits exercise in general offers from a therapeutic perspective.

The research results also explain that the reasons why many fitness professionals who may use differing schools of thought are all seeing what they do “work” in-practice is because they all believe in regular guided exercise. It is how fitness professionals from different schools of thoughts explain the results they see in-practice and sell their approach that is debatable. This is precisely why fitness professionals must test their in-practice experience

against the current preponderance of the scientific evidence. And, fitness professionals must realize that when they do not line up, the science in no way makes the outcomes they are seeing “in practice” any less real. It simply means that the explanation(s) they have given as the cause for why they had their experiences are likely wrong. In other words, the effect experienced was not likely caused by what they had thought.

The major takeaway from the previous sections is that, although it is often assumed that identified so-called “dysfunctions” in posture, movement quality, or body function are reliably predictive of potential injury and performance, the preponderance of the scientific evidence casts a great amount of doubt on any claims about the strength and reliability of such relationships. This is because natural variations in human posture, movement and mobility/flexibility make identifying strict ideas of what is “correct” difficult and possibly invalid in many cases. Humans naturally move in different ways to accomplish different tasks, and identifying small variations in that movement as a “dysfunction” may not be very useful or helpful.

The practical implications of this are that the fitness professional should not immediately qualify a movement pattern as a dysfunction just because it does not fit within certain standards of a given corrective exercise evaluation, and that fitness professionals can better appreciate that exercise in general is far more valuable from a therapeutic perspective than is often thought in corrective exercise belief circles.

If one has the question, “what should the fitness professional do instead to find a safe and individualized programming direction?” it is important to realize that standards from biomechanics and kinesiology already exist to help establish safe ranges of movement quality under varying degrees of load, so the fitness professional may not need to replace that well established standard with a questionable “dysfunction” judgment. The guidelines provide in sections 3 and 4 are based upon these standards.

### **Nocebo Concerns in Corrective Exercise Evaluations**

Before getting into the practical guidelines for programming and exercise prescription, it is important to address that an often underappreciated risk of some corrective exercise evaluations might be the “nocebo effect,” or threat/fear value, of these evaluations to clients. As the allied health fields understand more about pain and injury, allied health professionals appreciate the influence of patient/client beliefs on their risk of injury and pain and their likelihood of recovery. Specifically, patients/clients with beliefs about their body that center on fragility/risk of harm, the importance of appropriate posture, or the need to move in specific ways to avoid injury are more likely to have pain and less likely to recover from a future problem (9). That is the opposite of the kind of physical and psychological resiliency that personal training is designed to build. With this evidence in mind, allied health professionals also understand that when clients are told such things about themselves from an authority figure (as they

might be during some corrective exercise evaluations), that this potentially makes one’s clients less resilient and more prone to injury and pain (10). The authors suggest that fitness professionals who choose to use corrective exercise evaluations to guide their exercise prescription decisions consider this concept carefully, and relay evaluations to clients with carefully chosen words that are less likely to make the client think their bodies are fragile and prone to injury if they do not lift, bend, move, sit, or stand the way that the corrective approach or program suggests is best.

## **SECTION 3: PRACTICAL GUIDELINES FOR INDIVIDUALIZING EXERCISE PRESCRIPTION**

The practical guidelines below do not provide some kind of formal, evaluation procedure with standardized criteria of “normal” from which to judge everyone and make exercise prescription decisions based upon. The authors of this article promote the use of good personal training practices and a big-picture approach that involves the use of general guidelines that can be individualized for the safety and performance of exercises. The following are practical guidelines for finding a safe programming direction for individualizing exercise prescription.

### **1. Work Around, Not Through, Injuries and Limitations**

If, for whatever reason, an exercise causes pain for the client or athlete, a modification or alternative that does not hurt should be used. This is not referring to the sensation associated with muscle fatigue, which is to be expected. This is referring to aches and pains that exist outside the training session or flare up when the client or athlete performs certain movements. Such problem areas may simply need time to heal through rest and recovery, or they may be injuries—compromised areas of your body that can no longer tolerate the same level of load and do not improve with simple rest.

Either way, the fitness professional is not likely to help the situation by encouraging the client or athlete to train through pain. Although this might be considered obvious, many fitness professionals can be overzealous in training and many clients continue to push through pain if not coached differently. Continuing to perform exercises that cause pain can make things worse and lead to further damage. This could change a painful area that can be easily trained around into a debilitating injury.

Clients or athletes who experience consistent pain during exercise or appear to have an injury that compromises their performance, should be evaluated by a qualified medical professional. Fitness professionals should work to have a professional network of trusted experts outside their field to whom they can confidently refer their clients, such as a physical therapist or medical doctor.

## 2. Use the Two “C”s when Selecting Exercises

When selecting exercises for the program, whether or not the client has limitations due to pain or injury, following two simple criteria (the two “C”s) can be used to make effective choices:

- **Comfort:** The movement is pain-free, feels natural, and works within the client or athlete’s current physiology.
- **Control:** The client or athlete can execute the movement technique and body positioning as indicated by the fitness professional. For example, when performing barbell squats, the client or athlete is able to prevent the knees from caving inward and is able to maintain an appropriate spinal alignment throughout the exercise while displaying a smooth, deliberate movement.

To allow for comfort and control, the client or athlete may need to adjust the hand or foot placement of a particular exercise, change the range of movement, or adjust the load placement or carriage of the exercise to properly achieve the criteria. In some cases, one may just have to avoid certain exercises and emphasize other options.

## 3. Fit Exercises to Individuals, Do Not Fit Individuals to Exercise

One of the biggest training mistakes fitness professionals often make involves trying to fit the individual to the exercise instead of fitting the exercise to the individual. For example, many fitness professionals attempt to fit everyone into the mold of performing deadlifts in the conventional style with a barbell. Though well-intentioned, this approach is misguided. Given the natural and normal variations between human beings, just because some individuals can perform the conventional-style barbell deadlift, that does not mean that everyone should be expected to perform that same movement in the same manner.

Some exercises just do not fit well with certain bodies. People all move differently based on size and shape, which is dictated by each person’s unique skeletal framework and body proportions. Injuries, aches and pains, and the natural degenerative processes in joints (e.g., arthritis) can influence how someone moves. For these reasons, trying to fit every person to the same exercise movement is potentially dangerous. If doing so goes against an individual’s movement capability, it could cause a new problem or exacerbate an existing one. It is hard for clients or athletes to realize the powerful benefits of exercise if they become injured in the training process.

There is no one “best” way to do any particular exercise when one considers specifics such as joint angles, foot positions, and other technique alterations which are determined by the anthropometric differences between people. However, there are “ideal” strategies to teach individuals to meet their needs because general exercise coaching principles are applicable across all populations. Treating every exercise as an evaluation, which forces the fitness professional to pay careful attention to detail, provides

some of the most meaningful data from which to make exercise prescription decisions based on individual differences. When the fitness professional is evaluating and coaching exercises like the squat or deadlift, they should coach for an improved pattern, based on what squat or deadlift style(s) best fit the individual. As the above guidelines demonstrate, in order to individualize exercise prescription, the fitness professional must have coaching standards but avoid trying to standardize all their clients’ movements.

## SECTION 4: PRACTICAL GUIDELINES FOR SAFE AND EFFECTIVE PROGRAM DESIGN

The role of the fitness professional is to guide the client or athlete in a programming direction that will help them to safely and effectively do what they need to do in order to achieve their goals. Regardless of the individual training goal, the following are two general programming principles for finding a safe and effective training direction that can be applied to everyone.

### 1. Work to Enhance Overall Functional Capacity in the Areas of Mobility, Strength, and Work Tolerance

Functional capacity is one’s range of ability. In other words, higher functional capacity means that a person can perform a broader range of specific physical tasks. With this in mind, a comprehensive program should be aimed at helping the client or athlete improve physical qualities that are not necessarily addressed by performing activities of daily living or by simply playing and practicing their sport. For example, the fitness professional can help to increase the overall functional capacity of a client or athlete by the use of unilateral (single-arm or single-leg) exercises, with more training volume dedicated to the individual’s weaker or less-coordinated side.

One’s overall functional capacity can also be enhanced by providing movement variety in one’s training. This is because most clients and athletes do not want their body to be merely more adapted to a limited number of common exercise movements. Instead, most clients and athletes want their body to be more adaptable so that they can successfully take on a variety of physical demands.

Additionally, enhancing one’s overall functional capacity can be accomplished by making sure the resistance exercises performed throughout the full range of motion are done so while creating a load challenge safely. Since general strength training exercise principles recommend avoiding end-range joint actions in order to maximize safety in handling heavy loads, mobility exercises—exercise that emphasize joint range of motion over load—can also be included in the program. Mobility exercises can be used to complement the resistance training exercises because they require one’s joints to move into their end range of motion.

### 2. Be Progressive

In addition to weighing the risk versus reward of exercises to maximize training safety, gradual and consistent progress is a major evaluation criterion of a program’s effectiveness. In

using one's chosen exercises, the fitness professional looks for improvements in the amount of weight lifted or volume accumulated, quality and efficiency of movement, endurance and stamina, and recovery between sets.

It is important to note that the objective of programming is to create a positive adaptation to the training program (i.e., training stimulus) without reaching the point of accommodation, where the client or athlete stops positively adapting. With this in mind, due to the adaptive properties of the human body, the principle of progressive overload will only take the client or athlete so far. This is because at some point everyone within a training program reaches a plateau where they are unable to keep progressively overloading the same exercise movements. This is where applying the principle of variation comes in, which is the use of planned variety in exercise selection and training variables. Also, this is why effective, long-term exercise programming should have enough consistency to allow the client or athlete to see continued progress, and it should have enough variety to prevent boredom, staleness, and potential repetitive stress injury (45).

## CONCLUSION—THE TRAP IS THINKING SMALL

Corrective exercise-based thinking may inject unnecessary complexity into the mix, which creates confusion. It may also divide fitness professionals from more simple training principles and practices. Much of the corrective exercise trap this article has identified is that many fitness professionals might end up making their training process more about using a highly questionable formalized evaluation procedure and less about using well-established guidelines for good personal training. As a result, not nearly enough actual strength and conditioning would get done to create the type of training effect needed to achieve the fitness, physique, or performance goals of the client or athlete. Following the simple guidelines provided in sections 3 and 4 may be a more effective framework than a corrective exercise program because it can provide a training direction that will not only yield the same types of therapeutic benefits, but also create the type of training effect needed to improve one's health, fitness, physique, or performance.

This article contends that an emphasis on corrective exercise shows a sense of reversed priorities in fitness and training. Fitness professionals must avoid interpreting this article as being against corrective exercise as opposed to 1) being confident in the evidence base and impact of general exercise science, and 2) using specific client tailoring to help create an individualized and effective training program for each client. This article is not saying that corrective exercise approaches are bad or wrong. Fitness professionals who are using a particular corrective approach and seeing benefits are encouraged to not abandon this success. However, they should carefully consider what they spend programming time doing for their clients and how they explain their practices. Some fitness professionals may underappreciate the power of well-tolerated, consistently-performed exercise in

their clients or athletes and that corrective exercise approaches may place too much emphasis and time on programming that may not be providing as much clear value to the client or athlete. Fitness professionals must also carefully consider the standard on which they judge programming and exercise performance. They should place their confidence in universal exercise science principles and a dedication to individualized coaching.

Moving from a place where the fitness professional is thinking small, which is where corrective exercise practices lead, and towards big-picture thinking, which is where general exercise practices lead, is empowering to both the fitness professional and client or athlete. The big-picture view not only helps all involved to have a clearer understanding of the universal and wide-ranging benefits general exercise offers, but also makes the exercise programming process and communication more simplified and direct. This is precisely why the practical guidelines provided in this article for exercise prescription and safe and effective programming using general exercise principles should be considered fundamental and non-controversial. Finally, the authors of this article suggest that fitness professionals can benefit from a renewed appreciation of, and a passion for, general exercise principles and the power of individualized coaching outside a corrective exercise system.

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## ABOUT THE AUTHORS

*Nick Tumminello is the owner of Performance University, which provides practical fitness education for fitness professionals worldwide, and is the author of the book “Strength Training for Fat Loss.” Tumminello has worked with a variety of clients from National Football League (NFL) athletes to professional bodybuilders and figure models to exercise enthusiasts. He also served as the conditioning coach for the Ground Control Mixed Martial Arts (MMA) Fight Team and is a fitness expert for Reebok. Tumminello has produced 15 DVDs, is a regular contributor to several major fitness magazines and websites, and writes a very popular blog at PerformanceU.net.*

*Jason Silvernail holds a Master of Physical Therapy degree from the University of Scranton, and he has been in practice as a physical therapist since then. He completed his Doctor of Physical Therapy degree in 2006. He was selected for the prestigious Army-Baylor Doctoral Fellowship in Orthopedic Manual Physical Therapy at Fort Sam Houston for subspecialty training and graduated in 2010, earning both a Doctor of Science degree from Baylor University and Fellow status in the American Academy of Orthopedic Manual Physical Therapists. Silvernail is a board certified Orthopedic Clinical Specialist (OCS) from the American Board of Physical Therapy Specialties and a Certified Strength and Conditioning Specialist® (CSCS®) with the National Strength and Conditioning Association (NSCA). He is a career military officer, practicing in the United States Army since 1998. A clinician and researcher, he has published clinical commentaries and original research in the medical literature.*

*Ben Cormack has studied extensively in the fields of exercise and therapy. Originally from an exercise background, Cormack has gone on to study clinical sports therapy, rehabilitation, pain science, and movement over the last 15 years. He runs Cor-Kinetic, an educational company that delivers continuing education courses on how to use movement therapeutically in a framework of modern evidence and science in pain, movement, and rehabilitation. Cor-Kinetic have provided educational services for the elite level sports clubs, universities, and health organizations, as well as individual physiotherapists, osteopaths, chiropractors, sports therapists, rehabilitation specialists, and personal trainers.*