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Personal Training Quarterly (PTQ) publishes basic educational information for Associate and Professional Members of the NSCA specifically focusing on personal trainers and training enthusiasts. As a quarterly publication, this journal's mission is to publish peer-reviewed articles that provide basic, practical information that is research-based and applicable to personal trainers.

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The National Strength and Conditioning Association (NSCA) would like to recognize the exemplary work of Bret Contreras as the Editor-in-Chief of Personal Training Quarterly (PTQ) for the past three years. Thank you for your outstanding work and commitment to the PTQ.

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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.

When 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 verses 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, Hrysomallis 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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AVOIDING LIABILITY AS A FITNESS PROFESSIONAL

LEMAR MOORE, JD

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When hired to work with a new client, a personal trainer's foremost goal is to achieve satisfactory results for that client in a timely and efficient manner. At the start of the personal trainer-client relationship, the personal trainer's focus probably centers on designing an effective exercise program tailored to the client's goals, fitness level, budget, and schedule. At the start of a new relationship, neither the fitness professional nor the client may wish to discuss the prospect of serious physical injury, or review the legal consequences that might result from such an injury. Unfortunately, however, such injuries do occur, and the legal implications that follow them can be quite significant. With that in mind, personal trainers would be wise to consider such issues sooner rather than later. Taking small, reasonable precautions at the onset of a new personal trainer-client relationship can stave off significant problems down the road.

The following article addresses some of the legal risks that personal trainers may unwittingly assume when working with new or existing clients, as well as how they can minimize those risks early on. In short, reasonable caution and open communication with the client about the physical risks of training can save time, mitigate conflict, and reduce expenses for all parties involved in the event of unexpected harm.

PRECAUTION: AREAS OF RISK FOR A PERSONAL TRAINER

One key area of risk for personal trainers arises out of the fitness instruction they provide to their clients. It is important for personal trainers to ensure that the cues or other instructions they give are reasonable and grounded in a suitable exercise plan that is appropriate for the individual client. Failure to do so can increase a personal trainer's, or his or her employer's, risk for legal liability.

In 2012, for example, a former member of a New York-based gym sued following an injury she sustained while executing her personal trainer's instructions. The client's personal trainer advised her to “stick her butt out” while performing a Smith squat. The personal trainer neglected to mention that the client should keep her back straight when performing the exercise, and thus, the client's form may have been improper. After analyzing the merits of the lawsuit, the court ultimately allowed the former client's case to press forward. In doing so, the court noted that the personal trainer's instruction could have unreasonably increased the client's risk for physical injury (4).

Moreover, although personal trainers are often called upon to challenge their clients, progressions must be tempered by considerations for safety. Personal trainers must properly supervise clients as they progress them to avoid injury. More specifically, it is important to keep channels of communication open during training and that personal trainers are responsive to visual and verbal indicators of pain or injury. Otherwise, personal trainers and their employers could be placed at legal risk. For example, in 2014, a personal trainer and his employer were faced with a massive \$14.5 million verdict in a personal injury lawsuit by the personal trainer's former client. In assessing legal liability, the court placed emphasis on the fact that the personal trainer instructed his client to continue exercising despite the client's complaints of dizziness and blurred vision (8). The verdict underscored the importance of monitoring clients as they train, measuring vital signs, and keeping eyes and ears open for signs of harm.

In addition to taking reasonable precautions with respect to client instruction and supervision, personal trainers should also take into account their clients' physical abilities and health histories throughout. Risk of legal liability may fluctuate depending on a given client's prior experience with exercise or pre-existing injuries. That point was illustrated in a 2016 lawsuit, in which a personal trainer and his employer were absolved of legal liability for a client's injury during a personal training session. In that case, the court found it important that the client was an experienced

weightlifter who already knew the techniques involved with weightlifting and the inherent risks associated with the activity (1). Conversely, courts have stated that pre-existing injuries may call for additional care on the personal trainer's part. In the aforementioned case, wherein a client suffered an injury while performing a Smith squat, the court credited testimony from fitness professionals that such an exercise should have been contraindicated for someone with a herniated disc (4). Fitness professionals working with new clients should take care to get a sense of the client's exercise history, medical history, and physical readiness for the exercise regimen at hand. It is also important to clarify with the client early on that the personal trainer is not a medical professional, and is not qualified to diagnose or treat any medical conditions (3). Typically, a physical activity readiness questionnaire (PAR-Q) is completed and physician clearance is obtained before beginning any program.

PROTECTION: MITIGATING LIABILITY WHEN INJURY OCCURS

In addition to taking reasonable precautions when working with new clients, personal trainers can also implement protective and preemptive measures to guard against legal liability due to client injury. Professional liability insurance, whether purchased by the personal trainer or provided by the personal trainer's employer, is one critical measure. Before relying on such insurance, personal trainers should take time to understand the applicable policy's coverage and scope. For example, if a client sustains an injury during a personal training session, but does not file a lawsuit until after the personal trainer's tenure with the employer has ended, would the (former) employer's insurance still cover the claim? This and similar questions may be useful to ask early on in a personal trainer's term of employment. Any gaps in professional liability insurance coverage are better discovered prior to a client injury, rather than after.

Liability waivers are an additional (and frequently employed) measure to avoid legal ramifications. The inherent risk of harm assumed when engaging in an exercise program should be clearly communicated to the client at the outset of the relationship. Furthermore, the client's acceptance of that risk should be well documented. However, although liability waivers can be effective preemptive tools, they must be crafted carefully in order to be enforceable. In many states, for example, a generic exculpatory clause in a contract waiving liability for injury will not suffice for injuries sustained under the direction of a personal trainer, and such waivers would not be enforced in court. In these states (such as Texas), the liability waiver must expressly state that it applies to injuries sustained "due to the negligence" of a supervising fitness professional (2,5,7). For certain fitness facilities in New York, even specific liability waivers are unenforceable as a matter of law, and therefore, will not be credited by a court (6). Such contractual waivers are an important tool, but they are not wholly protective, and should be viewed as but one of several precautionary measures that a personal trainer should take.

CONCLUSION

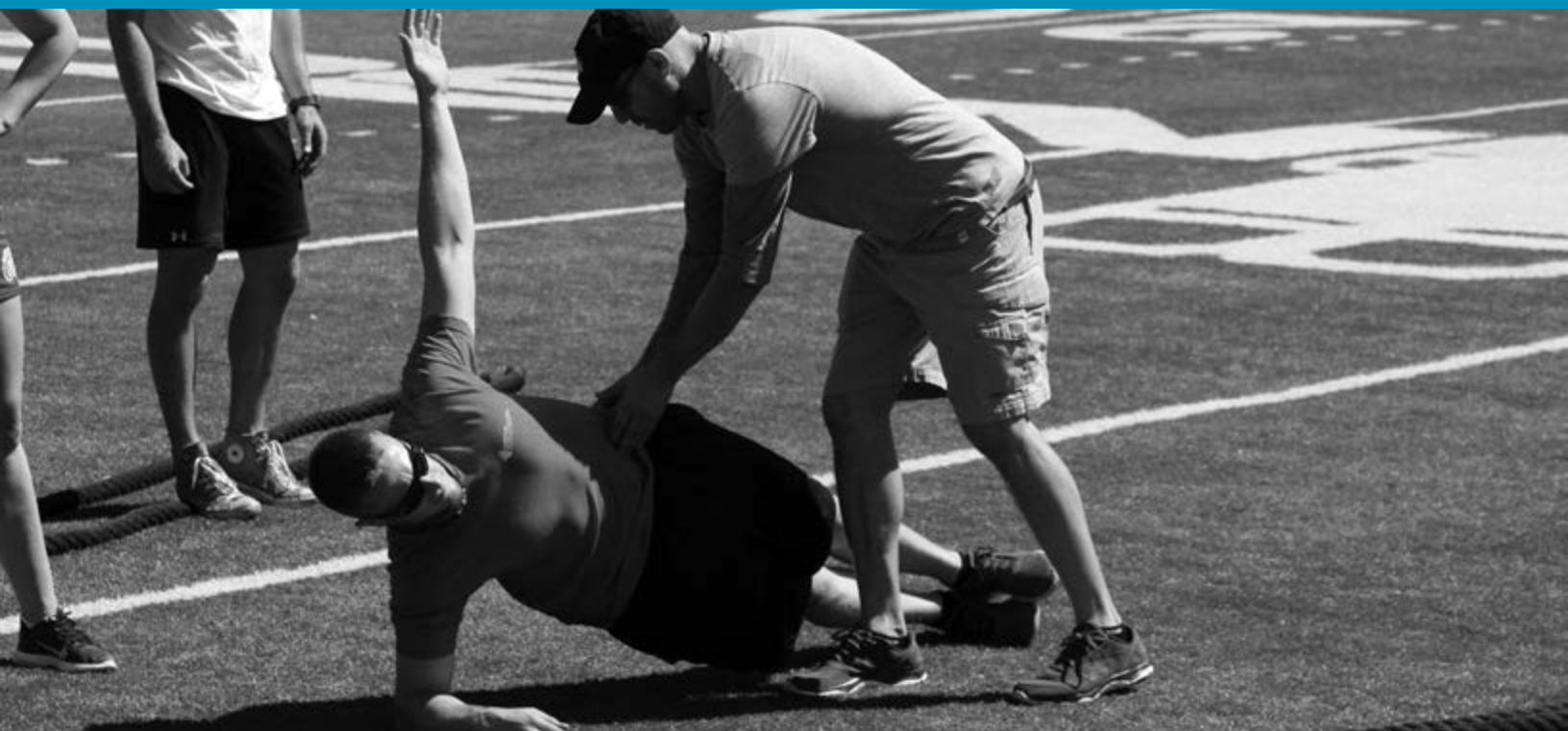
In sum, fitness professionals who are employed as personal trainers should recall that their clients quite often hold them in positions of trust. Their clients trust their experience and expertise, and rely on them to safely design and implement suitable exercise programs. That position of trust and expertise carries not just significance in the eyes of the client, but legal significance as well. Personal trainers should be aware of that fact and accordingly take reasonable precautions.

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CLIENT-CENTERED TRAINING— THE KEY TO DELIVERING MORE VALUE AND BETTER RESULTS

JOE DRAKE, MS, HKC, NSCA-CPT, USAW

Of all the training variables involved in a client's path to success, the most important is often consistency. This means coming back day after day, buying into the process, and being committed to the challenging journey of changing their body. At a fundamental level, one of the personal trainer's primary objectives is simply to keep them wanting to coming back. While this may sound simple, many personal trainers set themselves up to underdeliver on this goal from the beginning. Framing of the personal trainer-client relationship sets the stage for future success, and it all starts with the personal trainer's approach.

Clients first getting started with a personal trainer may experience one of the two following scenarios:

1. **Scenario 1:** A client comes in for the first time and explains that he or she would like to lose some weight. The personal trainer takes over the conversation from there and precedes to the whiteboard to explain the inner workings of glucose metabolism, insulin control, and gluten intolerance. The personal trainer has decided that these are likely the primary nutritional reasons why people like this client are overweight. After running the client through an overhead squat analysis, the personal trainer determines that they will need to fix their knee valgus before even focusing on weight loss. The personal trainer also explains that the client should lose at least 5% body fat. In order to do so, the personal trainer decides that the client will need to learn to barbell deadlift and do additional running on their off days. The personal trainer then slides the client into an already complete, six meal-a-day plan to get started on right away.
2. **Scenario 2:** The client comes in for the first time and explains that he or she would like to lose some weight. From there, the personal trainer asks why the client is looking to lose weight and what was it about today that made them come in. The personal trainer continues to ask open-ended questions to attain a deeper understanding. The personal trainer tries to find out more about the client's life, what they enjoy, what they are struggling with, and ask more about why losing weight is important. The personal trainer lets the client know that they will be involved in the planning process and that they want to create a plan that is challenging but realistic. The personal trainer paints a picture of what they will be working on but explains that it is a process that requires making changes and communicating. As for nutrition, the personal trainer explains that the goal is to start small. He asks the client to log their food for three days to establish a baseline of where to make suggestions and recommendations for the client to make improvements.

CLIENT- VS. TRAINER-CENTERED TRAINING

The primary difference between trainer-centered training (TCT) and client-centered training (CCT) lies in the focus. The first scenario is an example of TCT. In this scenario, the personal trainer may truly care about clients and want to see them get results, but they make the assumption that they know best and should be in control. This "expert mindset" and trainer-centered focus often, but not always, go hand-in-hand. Here the personal trainer asks fewer questions and is quick to make assumptions and decisions based on their expert opinion. Expectations may be high and they may be eager to impress clients with their level of

technical knowledge. While this may all be done with the best of intentions, it can overwhelm clients and actually work against their motivations to get started.

The TCT approach often fits clients into a “box,” where they believe every client should train a certain way. This training style tends to revolve around the personal trainer’s preferred style of training and expertise, rather than the needs or preferences of the client. This is most often done with a directing style of communication where the persona is that the personal trainer knows what is best for the client, and they should follow their lead (3). There can be a time and place for this approach, but it may fail to motivate many clients who need to be involved and invested in the process to make changes.

On the other hand, a CCT approach, such as the one described in the second scenario, portrays a very different strategy to working with clients. It all stems from adopting a coaching mindset where the client is the focus at all times. This is referred to as a guiding style of communication (3). Instead of talking at clients, personal trainers adhering to a CCT approach talk with clients. This approach is far more effective at quickly building rapport, which can go a long way in getting clients to commit to the demanding changes they will need to make in order to meet their desired outcomes. Unlike the TCT approach, the CCT approach acknowledges that clients have an individual physiology, psychology, and lifestyle that must all be addressed. Put simply, great personal trainers work with people not just bodies.

KEYS TO CLIENT-CENTERED COACHING

Developing a deep relationship of understanding and respect will likely not happen right away with every client; great personal training takes time. However, there are two primary objectives personal trainers can focus on doing with every client to facilitate this process.

TABLE 1. CLIENT- VS. TRAINER-CENTERED TRAINING

CLIENT-CENTERED APPROACH	TRAINER-CENTERED APPROACH
Asks thoughtful open-ended questions	Overwhelms clients with information
Takes client preferences into account	Fits clients into a “box”
Involves client in developing a plan	Makes assumptions based on trainer expertise
Different for each client	Takes a one-size-fits-all approach
MAY LEAD TO...	
More clarity on goals	Unrealistic expectations
Increased adherence	Less motivated to reach goals
More ownership and accountability	Lack of self-efficacy
Greater levels of client satisfaction	Total reliance upon personal trainer

TABLE 2. PERSONAL TRAINING ACADEMY (PTA) GLOBAL MOVEMENT STYLES AND PREFERENCES (1)

TRADITIONAL	HYBRID	PROGRESSIVE
Traditional weight training	Blend of the two	Circuit training/as many repetitions as possible
Consistency over change	Can vary daily	Seeks constant variety
More structured and practical		Less structured, more fun
Prefers to work out for repetitions/sets		Enjoys working out for time
Dumbbells, barbells, and machines		Kettlebells, ropes, and medicine balls
Goal driven		Emotionally driven

1. Strive to Understand

The CCT approach emphasizes finding out who clients really are and what drives them. Asking basic questions about what they do for a living and what workouts worked for them in the past can be helpful, but are really just surface level basics. Personal trainers who truly understand their clients are then able to nudge them along little by little and extend their threshold without overdoing it. Personal trainers looking to get to this higher level need to consistently ask more thought-provoking questions that lead clients down a path of self-awareness. Asking the right questions and motivational interviewing tactics can be powerful in helping clients arrive to conclusions and solutions themselves, rather than being told what to do (2).

Discovering what motivates them and what their favorite exercises are can go a long way; however, it does not stop there. It is critical to find out what type of exerciser the client is and what appeals to them. Some personal trainers train clients how they themselves like to work out. This could be a problem if the personal trainer likes to powerlift and the client is looking for something with more variety.

Table 2 below displays a way in which to categorize clients based upon how they might enjoy working out (1). As personal trainers further understand their clients, they can structure programs in a way that not only meets their goals, but also their personalities. Some clients may enjoy the consistency and mastery that a more traditional training approach employs, while others crave constant variety and want their training sessions to be a different experience every time. Personal trainers who can attain this level of understanding with clients are far more likely to keep clients motivated and engaged in their training long term.

CLIENT-CENTERED TRAINING— THE KEY TO DELIVERING MORE VALUE AND BETTER RESULTS

2. Involve the Client in the Process

Understanding what type of exerciser clients are is a great way of showing them that they are an active part of the process. Clients that feel more involved in their program are often more likely to stay consistent with their workouts, and stay mentally engaged in the tasks they need to accomplish to create change. Much like dancing, coaching lifestyle change works much better when partners move together, rather than one dragging the other across the floor (3).

Involving clients, just like becoming a great dance partner, can be achieved by constantly asking for feedback. The personal trainer should try to find out how they are feeling about the workouts and approach. Instead of asking the client if they are sore or how their day is going, the personal trainer should ask them to evaluate the process. Keep them involved by asking questions like:

- “How do you feel like you are doing with food right now and why?”
- “What do you feel really good about right now that is working for you?”
- “Where do you feel like you could do more or improve?”
- “In what area could you use more coaching?”
- “Is there anything you would like to focus on more in our workouts?”
- “How is that working for you?”

More importantly, when clients give good feedback, it must be addressed. For example, if a client mentions that they do not like barbell back squats, then the personal trainer should not try to force the client to perform them. Making adjustments based on their preferences will make it obvious to the client that the personal trainer is listening to them and willing to work together.

PUTTING IT TOGETHER

The following serves as a checklist that personal trainers can keep in mind when ensuring that they are following a CTC approach on a daily basis:

- Ask thought-provoking questions, avoid “yes” or “no” questions, and explore the client’s answers
- Avoid instances of doing more talking than listening
- Strive to talk with, not at, clients
- Try to think of a simpler way of explaining things to the client
- Regularly involve clients in the planning process, not only in the beginning
- Ask clients if there is anything they would really like to see in their workouts, nutrition, or overall program

Becoming a great personal trainer and using a CCT approach can not only be challenging, but also frustrating. Finding out how to give clients the right information, at the right time, and in a way that will resonate with them takes patience and experience. At times, it may be tempting to take the TCT route and tell clients what they need to do to get immediate results, but this may be selling them short on success in the long run.

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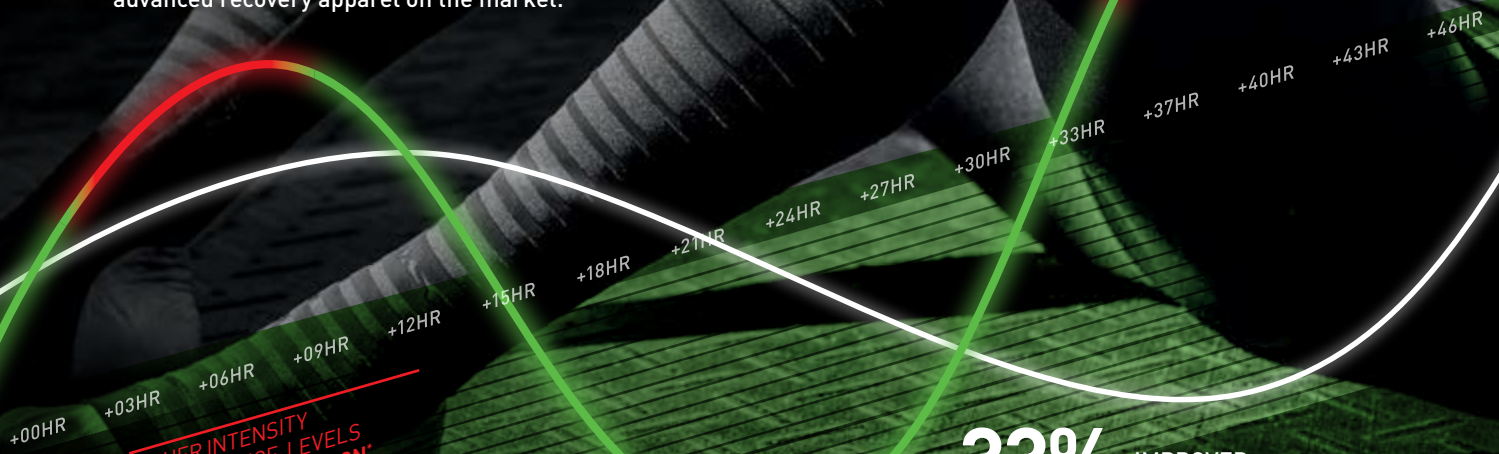
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EFFECTS OF EXERCISE ON TYPE 2 DIABETES—PART 1

CARMINE GRIECO, PHD, CSCS, AND MIKE REEDER, DO

PREFACE

This article is the first in a four-part series which will explore the impact of exercise on a variety of diseases. Strength and conditioning professionals should have a deep understanding of the positive effect exercise has on health and human performance. Despite the efficacy of exercise as both a preventive measure and treatment for a wide range of diseases and conditions, standard medical interventions, such as pharmaceuticals, remain the “go-to” option for most individuals. In fact, recent estimates by the National Center for Health Statistics suggest that nearly 50% of the United States population have used a prescription drug within the last 30 days (18). Therefore, the aim of this article series is to provide a context for understanding the efficacy of exercise as a therapeutic intervention and adjunct therapy, and then compare this to commonly prescribed treatments.

INTRODUCTION/EPIDEMIOLOGY

Chronic diseases related to lifestyle (e.g., physical inactivity and poor diet) choices, such as heart disease, hypertension, and type 2 diabetes (T2D), are seemingly becoming the norm. Recent data suggest that half of all adults in the United States have at least one chronic health condition (28). One of the most prevalent chronic diseases is T2D. T2D is a metabolic disease characterized by an inability to properly regulate blood sugar levels and can result in hyperglycemia, an abnormally high level of circulating sugar (i.e., blood glucose). In addition, it is closely associated with obesity.

The prevalence of diabetes, particularly T2D, has risen dramatically over the last few decades and parallels the rise in obesity in the United States. In fact, the prevalence rate of diabetes in the United States doubled between 1990 and 2008 (14). Moreover, according to the Centers for Disease Control and Prevention (CDC), 12.3% of adults in the United States have diabetes, with T2D accounting for 90 – 95% of all cases (8). Perhaps even more disturbing, the CDC estimates that an additional 37% of the adult population has prediabetes, a condition characterized by moderate hyperglycemia that falls below the diagnosable threshold of T2D (8).

Diabetes is a significant cause of morbidity and consistently ranks among the leading causes of death in the United States. According to the American Diabetes Association (ADA), adults with diabetes are 1.8 times more likely to have a heart attack and 1.5 times more likely to have a stroke than individuals who are not diagnosed with diabetes (3). Moreover, diabetes is the leading cause of kidney failure, non-traumatic lower-limb amputations, and new cases of blindness in adults (7).

The economic burden of treating diabetes is staggering. At an estimated annual cost of \$322 billion, diabetes treatment alone accounts for one out of every five dollars spent on healthcare in the United States (4). If present healthcare trends continue, future healthcare initiatives will need to be reimagined. Therefore, exercise must play a central role in this “new” version of healthcare. Prevention of diabetes and obesity is essential, and increasing physical activity should be at the core of those goals. Currently, only about 20% of adults in the United States meet the minimum recommended aerobic and muscle-strengthening guidelines established by the CDC (19). Nevertheless, exercise is well represented in the scientific literature as preventive of, and a treatment for, a wide range of chronic lifestyle-related diseases.

Unfortunately, the importance of physical activity in prevention and treatment of disease is not an essential part of the education of medical providers. More than 50% of medical schools in 2013 lacked formal education on the importance of physical activity as an essential part of healthcare (6). The vast majority of this education is focused on sports medicine or exercise physiology with less attention to behavioral counseling, lifestyle medicine, or preventive medicine.

TREATMENT OF T2D

The fundamental issue associated with T2D is an inability to adequately control blood sugar levels, which results in chronic hyperglycemia. Standard treatment of T2D involves both lifestyle and pharmaceutical interventions targeted at controlling blood glucose levels. However, the majority of individuals with T2D do not meet the physical activity or dietary recommendations;

therefore, achieving glycemic control routinely relies on pharmaceutical interventions (20).

Three common methods are used for diagnosing T2D: 1) measuring fasting blood glucose, 2) performing an oral glucose tolerance test, and 3) measuring glycated hemoglobin (HbA1c). HbA1c, which is commonly referred to simply as A1C, represents a long-term measurement of glycemic control. Circulating glucose molecules will frequently bind to the amino acid component of hemoglobin molecules, the oxygen carrying element of red blood cells. When this occurs, it is said that the hemoglobin has become “glycated.” This glycation, which is represented as A1C, occurs in a dose-dependent fashion (i.e., the higher the amount of circulating blood sugar, the more likely glycation will occur), with lower scores being indicative of good blood sugar control and higher scores indicating poorer control (1). As a result, A1C provide an estimate of blood sugar control over approximately the previous three months. A1C scores are expressed as a percentage of hemoglobin that has become glycated. A score below 5.7% is considered “normal,” a score of $\geq 5.7\%$ – 6.4% indicates prediabetes, and a score of $\geq 6.5\%$ is the criteria used to diagnose diabetes (1).

The ADA's Standards of Medical Care identifies the oral hypoglycemic agent, metformin, as the preferred initial drug therapy (2). Since it is outside the scope of this article to provide a detailed discussion of the effectiveness of each of the oral hypoglycemic drugs, metformin will be used as a representative example of the effectiveness of pharmaceutical intervention for the treatment of hyperglycemia.

Metformin lowers blood glucose levels primarily by down-regulating hepatic (liver) glucose production. Metformin is generally well tolerated and regarded as a safe drug therapy; however, there is still the potential for adverse side effects (2). Several previous meta-analyses have investigated the effectiveness of oral hypoglycemic agents and shown reductions in A1C that commonly range from 0.5% – 1.25%, with metformin performing better than most (23). For example, a more recent meta-analysis found that metformin decreased A1C by 1.12% in individuals with T2D in comparison to a placebo (15).

Achieving optimal glycemic control is the primary goal for the prevention and treatment of T2D, and decreasing A1C levels has demonstrated significant and broad-reaching benefits. In fact, one large-scale study found that a 1% reduction in A1C translated into a 37% reduction in microvascular complications (e.g., neuropathy and retinopathy), as well as a 21% reduction in diabetes-related mortality (25). Moreover, the earlier glycemic control is achieved, the greater the health benefits are over time—a concept which is referred to as the “legacy effect.” To summarize, the effect of drug therapy for hyperglycemia provides a benchmark for comparing the efficacy of exercise.

EFFECT OF EXERCISE ON T2D

T2D is characterized by a diminished production of insulin as well as a decreased efficiency of insulin action (i.e., insulin resistance), which can result in hyperglycemia. Insulin is the hormone responsible for transporting circulating glucose into various bodily tissues (particularly muscle and liver tissues) and plays a pivotal role in glycemic control and the development of diabetes. Exercise

influences glycemic control and insulin action through two broad mechanisms:

1. It acutely promotes the rapid uptake of glucose into working muscle tissue independent of insulin action. This unique effect means that the vigorous use of muscle tissue, such as exercise, bypasses the need for insulin to promote glucose uptake. The positive effect of a single bout of exercise on glycemic control can persist for 24 – 72 hr, depending on duration and intensity (10).
2. Chronic exercise training also exerts a beneficial impact on glucose uptake. While the exact mechanisms remain to be fully explained, glycemic control seems to be positively affected by increases in glucose transporters and insulin signaling pathways (10). Moreover, exercise that results in gains of muscle tissue may provide an increased opportunity for glucose disposal as well.

Physical activity is an acknowledged, but clearly underutilized, strategy for preventing and treating T2D. Many healthcare providers seemingly fail to recognize how strong the evidence is for the power of physical activity in the prevention and treatment of T2D. Multiple studies have shown that physical activity has been shown to improve glycemic control and cardiovascular fitness while improving body composition and quality of life (21,26). One of the first studies on this topic, from 1997, simply encouraged an increase in leisure-time physical activity with basic improvements in diet (21). Diabetes incidence significantly decreased over a six-year period in those high-risk patients with prediabetes (21). A similar program in Finland, which consisted of dietary and exercise (both aerobic conditioning and resistance training) interventions, found very comparable results with the risk of developing diabetes reduced by 50% (26).

In patients who are at a high risk of developing T2D (i.e., prediabetes), several studies have reported the impact of exercise and pharmacological interventions on preventing diabetes. The United States Diabetes Prevention Program (DPP) randomized patients who were at high risk for developing T2D and assigned them to either a placebo, metformin, or lifestyle modifications, which included exercise (16). The lifestyle intervention decreased disease incidence by 58% and the metformin decreased incidence by 31%, compared to placebo (16).

Another study looked at exercise plus metformin in decreasing the incidence of T2D (22). The relative risk reduction was 28.5% for lifestyle modification alone, 26.4% for metformin alone, and 28.2% with lifestyle and metformin combined when compared to a control group (22). These results provide strong evidence for prevention of T2D with lifestyle intervention. Furthermore, evidence supports the continued T2D risk reduction with lifestyle intervention. In the 10-year follow up of the DPP study, the cumulative diabetes incidence rate was decreased by 34% in the lifestyle group and 18% in the metformin group, compared to placebo (12). Other studies with lifestyle change and metformin have also resulted in continued prevention or delay of diabetes (21,26). These studies provide evidence that the benefits of lifestyle change for preventing T2D persists in high-risk individuals beyond the initial intensive intervention.

The ADA Position Stand on Physical Activity for the Prevention and Treatment of Diabetes recommends a minimum of 150 min per week of moderate-to-vigorous intensity aerobic exercise. Additionally, the ADA also recommends 2 – 3 weekly sessions of resistance training and two or more sessions of flexibility and balance training to maintain joint range of motion, muscular strength, and balance (11). Aerobic and resistance exercise both confer a positive impact on glycemic control and a recent meta-analysis provides a context for estimating these effects. A systematic review examined 47 randomized controlled trials (RCT) including 8,538 T2D patients that ranged from a minimum duration of 12 weeks up to a maximum of two years (27). Structured aerobic exercise alone, which represented 18 RCTs, had the greatest impact, decreasing A1C values by 0.73% (27). Resistance training, representing only four RCTs, demonstrated an average reduction in A1C of 0.57%, while combined aerobic and resistance training programs (seven RCTs) reduced A1C by 0.51% (27). Overall, structured exercise programs reduced A1C by 0.67% (27).

It is important to note, however, that individuals with T2D or prediabetes may benefit by performing more than the recommended minimum amount of weekly exercise. For example, a study found that exercise durations that exceeded the recommended 150 min per week resulted in even tighter glycemic control, reducing A1C values by 0.89% (27). Moreover, one study demonstrated a dose-response relationship of exercise on insulin action up to about 2,500 kcals per week (13).

The frequency, type, duration, and intensity of exercise all have the potential to influence glycemic control. Interestingly, combined training may positively impact A1C to a greater extent than aerobic or resistance training alone and the ADA's Position Stand recognizes this synergistic effect (11). For example, multiple studies found that combined training resulted in greater reductions in A1C than either aerobic or resistance training alone (9,24).

In summary, both aerobic and resistance training have consistently demonstrated an ability to positively impact glycemic control in individuals with T2D, with decreases in A1C averaging about 0.7%. This is similar to, although slightly less than, the effect of metformin, which reduces A1C by about 1%. That is to say, adding exercise as an adjuvant treatment has been shown to reduce A1C an additional 0.7%, which would be on top of the effect of metformin. It is important to note that the vast majority of studies that have attempted to quantify the effect of exercise on T2D do so with patients that are already using pharmaceuticals to improve glycemic control. Therefore, the reported effect of exercise is additive, rather than independent. This represents a significant gap in the scientific literature as it relates to the true effect of exercise on glycemic control for the prevention and treatment of T2D.

SPECIAL CONCERNS WITH EXERCISE AND THE DIABETIC PATIENT

When beginning an exercise program for diabetic patients, it is necessary to consider possible risks associated with exercise. The patient should talk with their physician about the risks and benefits, and discuss any specific concerns with exercise. Exercise can cause changes in blood sugar, the most significant changes being hypoglycemia or low blood sugar. This is not very common with T2D, but it can occur in older, poorly controlled patients and those on multiple oral diabetes medications or insulin (5). Extra caution should be used during illness because blood sugar control is often affected. Diabetes is associated with peripheral neuropathy, which decreases sensation of the hands and feet and may affect balance. For low-impact activities, appropriate footwear and careful self-inspection of feet and hands are important.

Hypertension, peripheral vascular disease, and cardiac disease are more common in those who have diabetes. Risk of a cardiac event is associated with exercise, but the overall risk is clearly higher for a diabetic patient who remains inactive. However, it is prudent to undergo an initial physician screening for the previously sedentary diabetic patient who is beginning an exercise program (17). The majority of these risks do not preclude exercise, but they may give indications for adjustments of the overall program.

CONCLUSION

While pharmaceutical treatment is complex, dynamic, and important for optimal glycemic control, exercise clearly plays a critical, but often overlooked, role in the overall treatment plan for patients with T2D or those at risk of developing it. Therefore, the importance of exercise should be emphasized by medical providers, personal trainers, and strength and conditioning professionals. The increase of physical activity in these patients is essential to their health and continued wellbeing.

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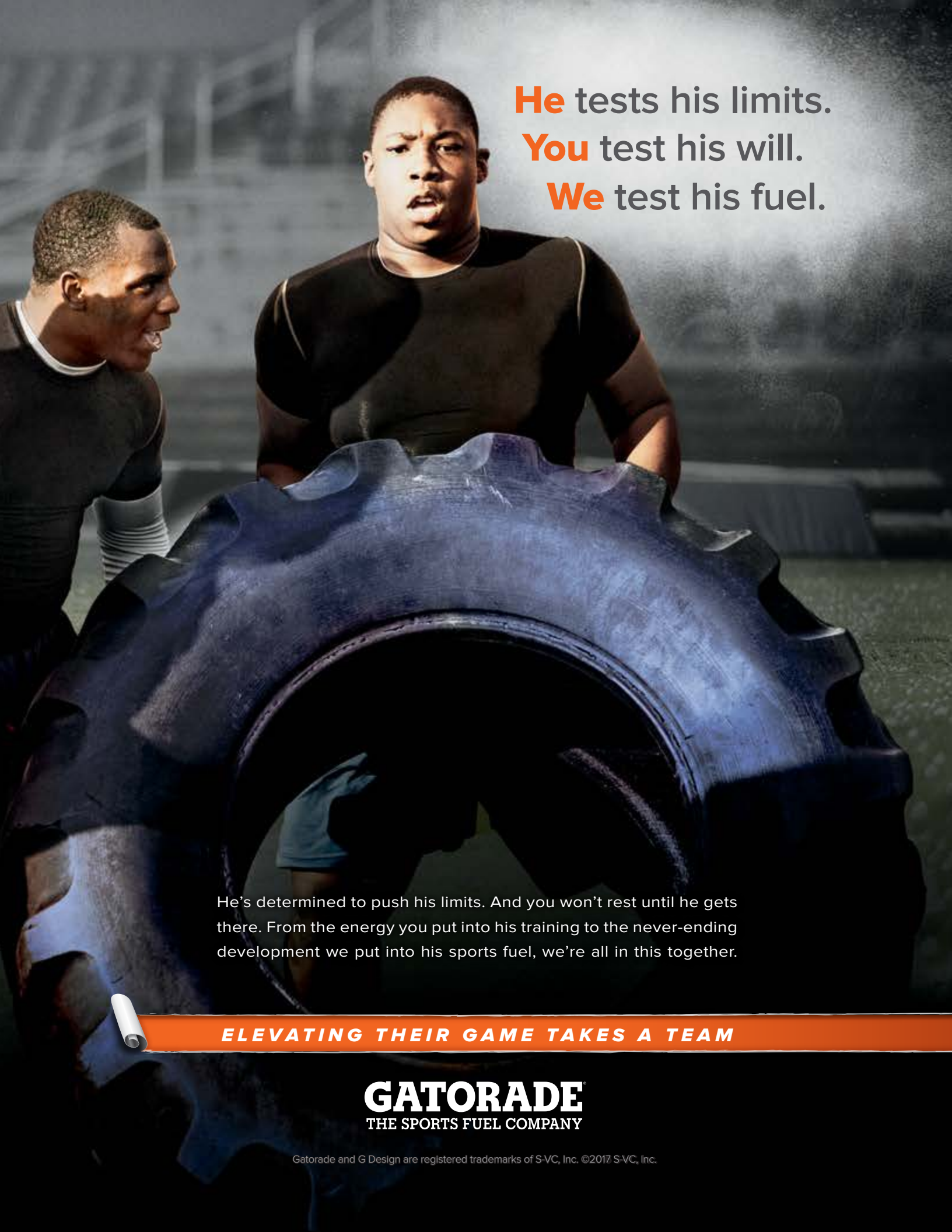
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DEVELOPING AN EDUCATIONAL CULTURE

DAVID OTEY, CSCS, NSCA-CPT

Personal trainers and strength and conditioning coaches around the world are the frontline and display of any fitness facility. The daily interaction between the strength and conditioning professional and the client on a daily to weekly basis molds the community, energy, and cohesiveness of a fitness facility. Interactions are either positive or negative. The more developed the staff is, the greater the positive impact they will have in their respective communities.

As a personal trainer or a business owner, the mentality is always, “How can I find more clients to build my business?” In order to maximize potential in this industry, like anything else, the personal trainer or business owner needs to invest to see dividends on the back end. Investing in structured education for employees can answer a lot of problems for personal trainers and business owners alike. Common issues, such as sales techniques and member interaction/experience, can be qualities that are developed over time. Implementing education for the staff is always customized to the needs of the specific facility and the overall direction of the culture and business. Increased unity in this approach can lead to improvements in team cohesiveness, representation, and ultimately, the day-to-day culture of the fitness facility.

IDENTIFY THE STAFF

The educational curriculum should be specifically tailored for the needs of the facility. Further, the curriculum should be focused on the continued education in the direction of the end goal. Each staff is going to consist of a group of strength and conditioning professionals who satisfy different needs of the member base.

If the facility is full of people with very similar personalities, then maybe the education structure should be focused towards diversifying the specialties that can be provided.

Topics are dependent on the strengths and weaknesses of the staff. If a fitness facility is looking to build on closing percentage, then implementing sales workshops around combating objectives and creating a detailed personal training recommendation are great assets. On the other hand, a staff may be capable of getting people involved in programs but retention and results are weak areas. In this case, it would be best to approach program design, exercise strategy, and long-term goal setting initiatives. In order to create a staff that custom fits the facility and overall fitness philosophy, it is important to train the staff towards that ultimate mold. For most situations, there are numerous focuses that need to be addressed. The best approach for this is to create primary focuses and secondary focuses. With multiple topics in a monthly/quarterly system, employees can see variance in the content to remain engaged while receiving information at the appropriate times in their development.

Internal seminars and workshops are intended to be beneficial to all staff members. With that said, benefit is a product of engagement. Mixing practical application and information-driven workshops can be a great way to integrate different approaches to offer different learning experiences. Gathering feedback after education is recommended to measure effectiveness. The more individuals are buying into the value of continued education, the more significant the overall impact will be.

CREATE A STRUCTURED CURRICULUM

Similar to program design, every situation is unique. Education being implemented internally is meant to be beneficial and not at the detriment of the overall business. It is important to identify what frequency and depth the educational implementation should have. With any new behavior, it is best to start with S.M.A.R.T. (specific, measureable, achievable, realistic, and timely) goals on what is expected from this (1). Additionally, when adjusting behaviors and routines, new initiatives need to be implemented in small, attainable pieces. The frequency of education should be based around the following factors:

- Frequency of current meetings
- Time availability of staff and educators
- Current education level of staff
- Diversity of staff knowledge
- Engagement level in education (not active to active)
- Space available for education

There are numerous scenarios on what can be introduced as education. The important factor is determining the proper frequency and depth of content. There are two important factors in creating sustainable education in a fitness facility. First, consistency in message and frequency is key. To create long-term habits, there must be a level or regularity that can be maintained (from twice per week to once a month). Only begin an educational approach that is realistic to maintain. If education is not kept as an important approach, it is less likely to be received by staff as an important approach. Second, engagement is a critical part of the

educational process and the topics need to be identified as useful, helpful, and interesting in order to garner the necessary attention for lasting change. Table 1 provides a yearly sample of different topics that can act as primary and secondary focuses.

It is important to have the topics of these meetings pre-planned, which is where programming can come in handy. Structured education allows the ability for the instructor to focus on the coaching specifically as opposed to worrying about teaching and planning (3). Ideally, the program should aim to create a situation with the lowest risk and highest reward. This same component can be translated to the educational curriculum, with scheduled topics that lead to diversity.

FIND THE FREQUENCY

Every staff is different. If a fitness facility is looking to implement education for the first time, it is best to take it in small strides. For example, a new program can progress from education once per month to eventually include more frequent education. Developed staffs can benefit from more diversified education. Table 2 provides a sample progression for education that can be useful. An important piece is allowing enough time for individuals to digest the information and recognize how to apply it to their own situation. An overabundance of different information can leave a cluttered perspective that results in less effectiveness. In this method, it may be best to implement goals in a mesocycle of the overall educational macrocycle for the group.

TABLE 1. SAMPLE EDUCATIONAL MACROCYCLE

MONTH	PRIMARY FOCUS	SECONDARY FOCUS
January	Movement	Business
February	Nutrition	Assessment
March	Regeneration	Functional Movement Screen (FMS)
April	Movement	Open
May	Nutrition	Business
June	Regeneration	Assessment
July	Movement	FMS
August	Nutrition	Open
September	Regeneration	Business
October	Movement	Assessment
November	Nutrition	FMS
December	Regeneration	Open

TABLE 2. SAMPLE EDUCATION PROGRESSION CHART

	LOW FREQUENCY	MODERATE FREQUENCY	HIGH FREQUENCY
Low Engagement	Monthly newsletter	Weekly article emails (scholarly Saturday)	Shared recommendation board books, articles, websites, seminars, etc.)
Moderate Engagement	Monthly staff inservice	Biweekly educational meetings (one sales, one education)	Member focused workshops taught by staff
High Engagement	Monthly team workout taught by manager or coach on staff	Team field trips (seminars, workshops)	Combination of any two moderate-high engagement categories

Throughout the year, there are natural ebbs and flows when specific education is more effective than others. For example, prior to a busy time of the year is a great time to work on assessment quality and program recommendation for potential clients. Following that, program design and corrective strategies can be potential focuses on developing client satisfaction and long-term client retention. The effect is in its immediate impact. When workshops or education encompass the current situations, it can increase the value of the education. Programming education will allow maximum impact with minimizing redundancy of the message.

HIRE INCOMING STAFF WHO LIVE THE BRAND

There are inherent qualities that a business should always strive to attain. Building the staff towards the direction of the vision is the first and most crucial step. Unfortunately, it is unrealistic that a fitness facility will be able to maintain a vision on development alone. The important part of hiring incoming employees is making sure they encompass the foundational qualities (e.g., integrity, time management, business ethics) and can be developed in further areas (e.g., sales, advanced program design, special techniques) (2). While it would be ideal to bring in an employee with a full spectrum of flawless qualities, it is not likely to happen often. Coachable qualities are a key component to progress an individual from a strong candidate to a strong employee. Combining good people with the curriculum that matches the specific needs is a great way to improve the energy and mentality of the staff.

CONCLUSION

Education is a fundamental piece of being in the fitness business. Continuing education is a mandatory part of maintaining status as a certified professional. With specific needs in a fitness facility, specific education can be implemented at the mutual benefit of the staff, ownership, and membership. Directed education has the capability of focusing on topics that can benefit revenue, program quality, trainer competency, member retention, staff unity, and overall member and employee engagement. To maximize education, S.M.A.R.T goals should be used to identify the overall vision and expectation of the curriculum. The depth, frequency, and modality of education should be carefully decided by the owner of the fitness facility. Programs of any size can benefit from the creation of an education program that will help evolve the mindset of the staff. Long-term goals can be achieved through making small but consistent change.

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ABOUT THE AUTHOR

David Otey is the 2016 Fitness Manager of the Year for Equinox Fitness Clubs. He currently is the Personal Training Manager for Equinox in New York City, overseeing a staff of 60+ trainers with 750 clients and \$500k/month in revenue. Otey graduated with a degree in exercise science from Rutgers University and currently holds both the Certified Strength and Conditioning Specialist® (CSCS®) and National Strength and Conditioning Association (NSCA) Certified Personal Trainer® (NSCA-CPT®) credentials through the NSCA. With 10 years in the industry, Otey has a knowledge base of commercial fitness centers and performance facilities. With his experience, he is a regular contributor to top fitness magazines and speaker on various fitness topics. Otey currently mentors trainers in program design, exercise protocols, and business development.

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LEVERAGING THE TRENDS IN THE FITNESS STUDIO/GYM COMMUNITY

JOSH LEVE

The word “trend” (used as a noun) is defined by the Merriam-Webster dictionary in the following ways (1):

- (a) a prevailing tendency or inclination
- (b) a general movement
- (c) a current style or preference
- (d) a line of development

The purpose of this article is to bring to light the trends that are happening right now that demand attention. Studio owners or aspiring owners can leverage current or emerging trends to grow (or start) their business, and better understand the fitness landscape to gain a competitive advantage now or in the future.

While broad in its description above, the definitions describing a trend tell a lot about the fitness studio community. In fact, one could even use option (b) “a general movement” to describe what has happened within the fitness studio industry over the last few years. By their very nature, fitness studios and gyms (ranging from 500 – 10,000 sq ft) have a distinct advantage over their larger counterparts—big box health clubs. Their tight communities, ability to adapt to change, and the intimacy that comes from belonging to a studio is incredibly difficult to duplicate. While the average size of a fitness studio is 3,700 sq ft and makes just under \$300,000 in revenue a year, the big box facilities, such as LA Fitness™, 24 Hour Fitness™, or Life Time Fitness™ have taken notice (1).

THE STUDIO WITHIN THE BIG BOX

In a classic example of “if you can’t beat ‘em, join ‘em,” the focus of traditional health clubs has increasingly become studio-centric. In fact, a presentation on fitness studios and how to compete with them at a International Health, Racquet and Sportsclub Association (IHRSA) conference in 2016 (which is mainly attended by health club owners/operators) was received by a standing room only crowd. Health club operators are currently trying to figure out where the growth is coming from, why it has happened so quickly, and how they can get a piece of the pie. Fitness Formula Clubs (FFC) in Chicago, IL, has made it a point to create “high performance centers” and carve out specific areas in order to recreate the studio within the box

concept. In 2017, not only will health clubs look to recreate this environment, but also look to open their own studios, either as brand extensions or completely new business models.

From a studio owner’s perspective, this insight provides a unique opportunity. This trend shows a sense of copycat syndrome. Studio owners, by their very nature, are celebrities in their own right. If done correctly, they command the attention of their clients, have a strong social media presence, and motivate their team to create the most engaging experience possible for their members/clients. By understanding what your competitors are trying to do, it allows you a keen understanding of what got you to where you are today. Personalization, customization, high-touch, results driven coaching—what a studio owner needs to take away from this trend—are things that are commonly done in fitness studios all over the country. Embrace this trend, know that it exists and provide an experience so grand that no health club could ever duplicate.

Just as the big box health clubs have been trying to figure out what to do to keep up with fitness studios, so have the major fitness manufacturers. Traditional products and prices from these large equipment manufacturers are not always suitable for the studio environment. That appears to be changing, and changing rapidly. Major brands have already started churning out more studio-focused products at prices that are more attractive to small businesses.

BE NIMBLE, BE QUICK

According to Stephen Tharrett, author of *STUDIO SUCCESS! Association of Fitness Studios’ Authoritative Guide to Owning and Operating a Fitness Studio*, “today, because of technology and shifting generational values, what consumers want and what they use can change in a blink of an eye. Trends that used to take years to evolve and garner traction can now emerge quickly, and if your business doesn’t respond quickly, then any potential competitive advantage that could be gained by leveraging the trend may be lost,” (6).

Furthermore, fitness studios must identify and learn to pivot when necessary if they want to stay on the cutting edge of consumer wants and needs. To do so, an owner must leverage the trend of providing increased training/education for instructors of their facilities. As classes and training options increase, so too does the need for personal trainers to keep pace. Factors like medical community connectivity and the pressure to enhance their individual competencies will push these personal trainers to continue to grow. On this need to rapidly adapt, Chief Executive Officer of Yelp™, Jeremy Stoppelman said, “You have to be very nimble and very open minded. Your success is going to be very dependent on how you adapt,” (8). However, pivoting does not mean changing core beliefs or practices that made the business successful in the first place. Instead, it means shifting certain strategies within the business and taking a step back to reassess what is and what is not working. Once these needs are identified, then next step is to fulfill these needs.

LOCAL BUSINESSES VERSUS CORPORATE ENTITIES

Have you ever shopped at your local farmer’s market? What about a local gift shop where the owner makes their own greeting cards? There is a feeling you get when shopping locally that you are doing something for the greater good. You are supporting your local community. And this trend of consumers flocking to local businesses and staying away from corporately owned chains is evident in the growth of the fitness studio market where IBIS World reports show over 100,000 fitness studios (2,3,4).

In today’s ultra-competitive fitness landscape, studios are everywhere. The growth of this market shows the trend to support local businesses is alive and thriving—especially when you have a product or service that helps people feel better about themselves and reach their health goals.

And studios can leverage this data. By better understanding the needs of their clients, they can shift their strategy to meet the needs of their consumers, and usually much faster than others in the fitness industry (especially the larger big box clubs). In fact, many times fitness studios are at the forefront of many new trends, identifying new, unique, and results-driven workouts that cater to the specific needs of their clients.

Another advantage that fitness studios have is results-driven training. This personalized approach to business ensures that at all times of the day, the client’s needs are understood. It also implies that a program is in place, and that inspiration and support are always provided by the staff.

Consumers in today’s day and age expect authenticity from the businesses from which they buy. This authenticity is linked to trust. Consumers expect the people and businesses they deal with to be genuine. Along the same lines, consumers typically prefer businesses that are invested (e.g., similar values or charitable involvement) in the community. Another current trend is to be community-oriented and support local businesses instead of large chains. When purchasing locally, consumers feel they are less likely to be taken advantage of and it adds to the feeling that the business genuinely cares about its consumers.

REAL TIME CONVENIENCE

One of the biggest trends within fitness studios is the focus towards convenience. For instance, think about a group exercise schedule at a big box facility. There might be a few yoga or high-intensity interval training (HIIT) classes to choose from, but what happens if work or personal schedules get in the way? Fitness studios are often able to offer what consumers want every day of the week, sometimes multiple times a day. Plus, classes can be offered on a schedule that fits the client’s lifestyle, rather than requiring the client to alter their schedule.

A common saying is “the only constant is change,” and so it is with fitness classes. Including self-defense, dance, bodyweight training, rowing, combination workouts, HIIT, or sports-specific classes, niche classes are likely to continue growing. With this rise, it is fair to expect to see more hybrid workouts like “athletic yoga,” partners, virtual classes, and HIIT variations. All of these specific niche classes are ideal for the burgeoning fitness studio marketplace.

For the average consumer, there have always been several objections to becoming a paying member of a fitness facility. One such objection is that the fitness facility is not advantageously located near where the consumer lives or works. Fitness studios are popping up everywhere; with so many fitness studios, there is bound to be one conveniently located for most consumers. But studio owners need to take notice. While being convenient can be beneficial to those who live nearby, an owner must not get complacent with the experience the client receives. And this could not be more evident within the first 90 days. This is where the development of a new habit is typically formed. Your clients will be open to new ideas and new ways to change their lifestyle, and it is up to you to foster this change. So while convenience makes a difference in the minds of a consumer, this trend of an abundance of fitness studios is likely to continue for the foreseeable future. Take notice, build a community from day one, get them integrated, and support them along the way.

OPEN MINDEDNESS, ALMOST TO A FAULT

Albert Einstein once eloquently stated, “We cannot solve our problems with the same thinking we used when we created them,” (7). When trends pop up in the fitness industry, the first challenge for every fitness studio operator is to reach a decision quickly regarding that trend. The next step is committing the necessary resources to acting on that decision. It is not about having unanimous agreement on the decision; instead it is about quickly building consensus with the caveat that the leader or owner should be able to make an executive decision when necessary.

Many great fitness studios have the ability to see the business climate more open mindedly than their larger more entrenched competitors. Furthermore, they often have far fewer bureaucratic processes to deal with to swiftly make a decision and act on it. Rapid innovation is all about being nimble and quick.

LEVERAGING THE TRENDS IN THE FITNESS STUDIO/GYM COMMUNITY

While trends come and go, one thing that remains constant in the fitness industry is that the member experience trumps all. A client who has seen success and has built a relationship with you is unlikely to seek out a lower priced competitor. It is your job to understand the trends happening today so you can leverage this information, apply to your business where applicable, and take your business to the next level.

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HOW TO SUCCESSFULLY NAVIGATE A CLIENT'S INITIAL SUCCESS SESSION AND ITS IMPORTANCE

DOUG SHEPPARD, NSCA-CPT, RKC

It is important to establish the initial client interview as an opportunity for the personal trainer to set the stage for the client's future success while under their guidance and care. In today's training environments, most of the attention in the initial meeting with the prospective client is spent on discussing training protocols, program designs, and assessments. These components have their importance; however, ignoring a few other valuable steps and rushing into administering a training program can greatly hinder long-term gains for the client. This article will explain the client interview, or as it is commonly referred to, "success session." This will include, but not be limited to, the following:

- Goal setting (short- and long-term)
- Medical screening and exercise clearance
- Emotional and personality assessments
- Physical assessments (e.g., Functional Movement Screen [FMS], Y Balance, body fat and body measurements, jump and speed testing)
- Nutrition assessments
- Explanation of training policies and protocols
- Recommended program design (e.g., frequency, exercise intensity, duration of exercise, type of exercise)

SETTING GOALS

Goal setting is the first step that must be addressed in the initial meeting. Training objectives should be as individualized as possible. In creating a program for prospective clients, the personal trainer should address variables such as frequency of workouts, duration of training sessions, exercise intensity, and

exercise modality. To recommend the correct program, the clients need to first communicate their desired outcome. This will enable the personal trainer to determine if they can provide the services requested. All training is not the same (e.g., sport-specific, youth, senior, tactical, strongman). Additionally, it is important that the personal trainer stays within the scope of what they are qualified to administer. Facility layout and available equipment can also create certain limitations. A resourceful personal trainer should have a network of certified personal trainers who specialize in different types of fitness instruction. When presented with a prospective client with training needs outside of their training specialty and skill set, referring to a different qualified professional may be a better option. It should be the objective of the personal trainer to provide the best research-based and results-oriented program for the client.

The S.M.A.R.T. (specific, measurable, attainable, realistic, and timely) approach to goal setting has proven to be effective (6). It is the responsibility of the personal trainer to explain what is realistic and in what timetable the prospective client can expect to reach their desired outcomes. It is during this process that the personal trainer can help distinguish the process from the outcome. The personal trainer can also differentiate which goals are short-term or long-term. For example, learning how to perform a kettlebell swing is a short-term goal, while dropping 30 lb of body fat and putting on 10 lb of muscle are long-term goals. The goal setting discussion starts rapport building between the client and coach and initiates communication. A recommended approach for the personal trainer is to focus the client's attention

on short-term process-driven goals that lead to long-term and outcome-driven success. The personal trainer/client relationship is built on the foundation of quality communication between both parties. The most important components in this step are the personal trainer's listening skills and ability to express empathy when needed.

It must be understood that it is the desired outcome, not the process that most likely brings prospective clients to seek the services of a personal trainer. Feeling comfortable in a bathing suit while on summer vacation or looking more attractive are popular desired outcomes. Exercising 3 – 5 days a week at an elevated heart rate, while experiencing some slight discomfort, may be the process for achieving that outcome. Theories of human behavior have long shown that immediate experience often outweighs future rewards (4,6). It is hard to do something uncomfortable, even if it will yield long-term benefits (4). Struggling with this inevitable initial process may be where the personal trainer needs to provide ample emotional support to help the client overcome this hurdle.

The fear of getting hurt and the anxiety of appearing unskilled in front of others is a popular reason people seek out the services of a certified personal trainer. Personal trainers should acknowledge this common phobia and allow the client to experience initial success in early workouts, which can help diminish some of these fears. This initial success can go a long way in helping to build confidence in physical movement for the client. It has become commonplace for gyms and fitness facilities to offer personal training in various formats (e.g., private, semi-private, large group, or team). The personal trainer needs to determine which environment will be the most suitable option and fit for the client.

PRESCREENING

The next area of discussion is getting clearance for the client to exercise. The American College of Sports Medicine (ACSM) recommends that people see a medical doctor before engaging in vigorous exercise if two or more of the following conditions apply (5):

- Above 35 years of age
- Family history of heart disease before age 60
- Currently smoke or quit smoking in the past six months
- Do not normally exercise for at least 30 min, most days of the week
- Significantly overweight
- High blood pressure or high cholesterol
- Type 1 or type 2 diabetes, or impaired glucose tolerance (also called pre-diabetes)

The personal trainer should provide a prescreening activity questionnaire or physical activity readiness questionnaire (PAR-Q), which will determine if any symptoms of the big three chronic diseases are present (cardiovascular, pulmonary, and metabolic). If any symptoms are found, a physician's consent is necessary before undergoing exercise testing/assessment or even participation (3).

IMPLEMENTING AN ASSESSMENT

The next phase is the application of an assessment. Much has been debated on which assessment to use and should be considered standard protocol. For the sole purpose of this article, recommendation of which assessment should comprise the standard will not be discussed; instead, it is recommended that there should be some type of assessment that can be used to document client improvement. The act of administering an assessment allows the personal trainer to create a program by using their judgment from the data collected. The assessment should be relative to the client's goal. For example, if the desired outcome goal is to drop body fat, establishing their current level of body fat (via skin fold caliper or taking body measurements) would be appropriate. If the goal is to improve performance for sport, the FMS, speed test (10- or 40-yard sprint), and/or vertical jump test may be a better fit (1).

After completion of the physical assessment, there should be some form of nutrition assessment. The personal trainer should expect multiple questions from clients in respect to nutrition. It can be debated that nutrition plays a larger role in client gains than physical exercise. Nonetheless, many personal trainers ignore addressing nutrition due to either a lack of knowledge, fear of stepping outside their scope of practice, or lack of having a consistent system to answer the questions. Most states have laws regulating the practice of dietetics. Licensure is required in 37 states, the District of Columbia, and Puerto Rico (2). In these cases, statutes include an explicitly defined scope of practice for a nutrition professional. Importantly, the limitations to scope of practice dictated by state laws trump the other determinants of scope of practice, such as education and training or expertise and skill level (2). In states without legal restrictions, fitness professionals may be legally allowed to offer nutrition services, as long as the services offered are consistent with their education and training (2). The personal trainer should be able to collect information that will provide a basic footprint of the client's nutritional habits. They, in return, can provide sound recommendations supported by research, not trends. The personal trainer can be a resource in providing education and research-based evidence to assist the client in making healthy eating decisions.

After collecting these materials, the personal trainer should provide, in writing, all protocols and policies of their personal training practice. This may include, but is not limited to:

- Breakdown of services that will be provided
- Recommended proper training attire
- Accepted forms of payment
- Rescheduling and cancellation policies
- Length and expiration of training sessions
- Gym/studio check-in procedure

HOW TO SUCCESSFULLY NAVIGATE A CLIENT'S INITIAL SUCCESS SESSION AND ITS IMPORTANCE

CONCLUSION

As mentioned earlier, clearly communicating these protocols is important in ensuring a successful relationship between the client and personal trainer. Once the personal trainer has listened to the needs of the client, documented short- and long-term goals together, received adequate medical clearance, assessed the client (physically, emotionally, and nutritionally), and explained the training procedures, they can proceed to mapping out an exercise blueprint of how they intend to get them to their desired fitness goal. This is where the personal trainer can explain the recommended frequency of training, the duration of training, and the type of training. This process may initially appear drawn out, but with a proper system installed, it can be completed within their initial visit. Taking the time to explain and collect this valuable data demonstrates commitment in helping the client to reach their fitness goals and will allow the personal trainer to script a comprehensive and personalized program.

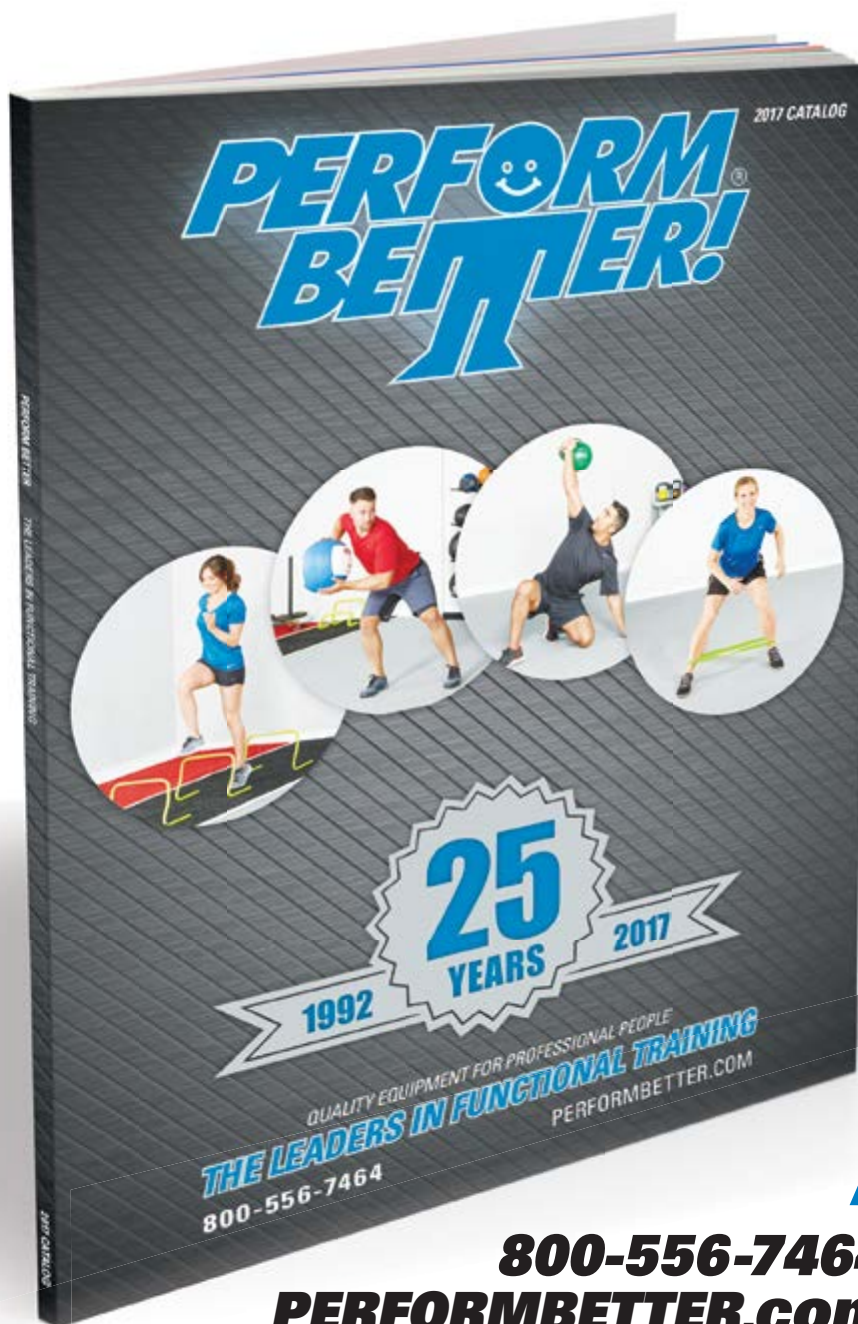
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ABOUT THE AUTHOR

Doug Sheppard is the owner of J & D Fitness Personal Training Studio in Las Vegas, NV. He currently is a volunteer for the National Strength and Conditioning Association (NSCA) as the Nevada State Director. He was a finalist in 2016 for the NSCA Personal Trainer of the Year. He is a certified personal trainer with the NSCA, American College of Sports Medicine (ACSM), and American Council on Exercise (ACE). He is a certified kettlebell instructor with the Russian Kettlebell Certification (RKC) and a Level 1 Coach with Precision Nutrition. In addition to running his training studio, he mentors students of the University of Nevada, Las Vegas Kinesiology and Nutritional Sciences Program along with rookie trainers looking to enter the fitness industry. Sheppard has over 25 years of experience in the personal training industry.

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DEFINING THE PROFESSIONAL PERSONAL TRAINER

ROBERT LINKUL, MS, CSCS,*D, NSCA-CPT,*D

The part-time efforts of “moon lighting,” or personal training during early mornings, late evenings, and other unconventional hours, has slowly transitioned over the last 30 years into something new. With 36% of the United States population being obese, 34% with metabolic syndrome, 18% with osteoporosis, and 12% with arthritis, the need for professional personal trainers has come to the forefront (2,3,4,6). With just over 279,000 fitness professionals working in the United States, the potential to build and maintain a full-time schedule of committed clients is very possible (8).

Based on these statistics, personal trainers seeking a career will find many people (more than 100 million) from many different demographics in need of their services. With the average investment for personal training being \$200 per client per month, professional personal trainers have the potential to earn over \$100,000 a year if they apply themselves appropriately. For the purpose of this article, a “professional personal trainer” is defined as having a full-time work opportunity as an employee or being a self-employed contractor working 30 or more hours a week and being able to afford health benefits and retirement opportunities.

It is not ideal or reasonably possible to consistently train 50 clients twice a week in a one-on-one business model. However, many top-level personal trainers are capable of hosting over 100 training sessions per week (50 clients coming twice a week) using different training styles such as running partner, semi-private, group, and boot camp training sessions. It takes time to build a 50+ person clientele business, but it can be accomplished by individuals committing their full-time efforts into this career path. Once achieved, a professional personal trainer can earn upwards of \$120,000 per year, the opportunity to purchase or qualify for health benefits, and the ability to save toward retirement. Table 1 provides a general idea of what a personal trainer can expect their average annual income to be based on trainer sessions per week over time.

Below are four industry standards and guidelines required to establish a reputation and build a business that results in permanent full-time employment (or self-employment) as a professional personal trainer. These guidelines include the self-governing standards for personal trainers, professional paperwork, and record keeping. The guidelines place an emphasis on

TABLE 1. ESTIMATED ANNUAL INCOME FOR PERSONAL TRAINERS

NUMBER OF CLIENTS	SESSIONS TRAINED PER WEEK (YEARS TO ACCOMPLISH)	AVERAGE HOURS WORKED PER WEEK	AVERAGE HOURLY INCOME (\$25 PER SESSION)	AVERAGE ANNUAL INCOME*
12	24 (1 year)	24	\$25	\$31,200
25	50 (2 years)	32	\$39	\$65,000
37	74 (3 years)	36	\$51	\$96,200
50	100 (4+ years)	40	\$63	\$130,000

* Average price based on American Council on Exercise (ACE) Salary Report of Health and Fitness Professionals (1)

developing a personalized and professional affective relationship with a client, and application of current scientific research to a client's program design.

1. Professional Self-Governing Standards (7)

- a. Obtain a National Commission for Certifying Agencies (NCCA) accredited certification
- b. Hold a current and accredited cardiopulmonary resuscitation (CPR) and automated external defibrillator (AED) (first aid is suggested)
- c. Complete 20 (or more) continuing education credits per year in order to maintain certification
- d. Hold current professional liability insurance
- e. Work within the scope of practice
 1. Assess physical limitations and establish S.M.A.R.T. (specific, measurable, attainable, realistic, and timely) goals
 2. Develop, progress, and cue a safe and effective strength and conditioning program
 3. Provide general health and nutritional guidance

2. Professional Paperwork and Records for All Clients (9)

- a. General contact, emergency contact, and information form (initial interview and consultation)
- b. Movement assessment form (optional)
- c. Physical activity readiness questionnaire (PAR-Q) and health history form
- d. Liability waiver
- e. Agreement (i.e., contract)
- f. Ongoing notes about each client

3. Personal Attention (5,9)

- a. Provide personal attention for one-on-one, semi-private, and group training
 1. Personal interaction, coaching, and cueing based on the goals and physical limitations of each individual client
- b. Focus programs on the client's SMART goals
 1. Obtain the client's personal information, physical limitations, health history, and goals to allow for a proper program design to be created
 2. Individualize programs (no cookie cutter programming)
- c. Increase personal and emotional connection and make certain dates more special (sporting events, birthdays, holidays, etc.)

4. Science-Based Program Design (5)

- a. Research training styles, techniques, and strategies based on a client's goals and physical limitations
- b. Implement proper coaching cues and progressions based on a client's goals and physical limitations
- c. Use appropriate loads, repetitions, sets, recovery periods, and tempos based on the client's program requirements

emotional connection, and continually educating themselves on current research and applications to deliver the best product to their clients.

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ABOUT THE AUTHOR

Robert Linkul was the National Strength and Conditioning Association's (NSCA) Personal Trainer of the Year in 2012. He is currently a volunteer with the NSCA as the Southwest Regional Coordinator and Committee Chairman for the Personal Trainers Special Interest Group (SIG). Linkul is the Career Development columnist for the NSCA's Personal Training Quarterly (PTQ) publication and speaks internationally on career development techniques for personal trainers. Linkul mentors personal training students and rookie trainers entering the industry on business strategies, client retention, and professional longevity. Linkul has been in the industry since 1999, and owns and operates his own personal training studio in Sacramento, CA.

Personal trainers have different areas of expertise and are known for different specialties. However, if they are professional personal trainers, then they should share several common traits. They focus on the four industry standards and guidelines and allow their product to speak for itself. A professional personal trainer develops their reputation by maintaining high standards, keeping high-quality records, emphasizing a personal and



SAMPLE LUMBO-PELVIC HIP COMPLEX STRENGTHENING PROGRAM

TIM LESZCZAK, PHD, AND GRAYSON ELMORE, MAED, ATC, LAT

The recommendation for the implementation of lumbo-pelvic hip complex strengthening interventions into fitness programs has been widely purported as a necessary component to improve performance and decrease injury risk for a variety of physically active populations (2). The proposed mechanism behind lumbo-pelvic hip complex strengthening is the notion that this area must be stable during movement to allow for efficient force transmission to occur throughout the kinetic chain (4). In addition, the various muscles that comprise this area are often considered to be some of the most important muscles, not only for strength and power generation in the human body, but also for controlling joint alignment during physical activity (2).

Various studies show that a strong and stable core provides the necessary foundation to maximize performance and minimize injury risk (6). Sato and Mokha identified that a six-week lumbo-pelvic hip strengthening program improved 5,000-m running times compared to a control group (7). Geovinson et al. identified that a nine-week lumbo-pelvic strength program improved jump performance parameters in volleyball athletes (8). Finally, Araujo et al. determined that a six-week lumbo-pelvic strengthening program improved landing kinetics and may also reduce lower extremity joint stress upon landing in female athletes (1).

Unfortunately, few studies investigate the direct role lumbo-pelvic strengthening has on force production, reduction, and dynamic joint stabilization (6). Also, the large bulk of literature currently available on the role of lumbo-pelvic hip strengthening and

improved vertical jump performance has associated elements of plyometric or other traditional types of exercises involved in the training program (6).

The purpose of this article is to provide a sample six-week lumbo-pelvic hip complex strengthening program with the intended goal of improving vertical jumping ability and/or landing mechanics without the addition of plyometric and/or jump landing drills. In addition, insight into how to measure performance outcomes that could be used to determine program efficacy will be presented.

SAMPLE TRAINING PROGRAM

Incorporating simple lumbo-pelvic hip complex exercises into a warm-up routine can improve your client's posture and awareness when exercising and/or performing activities of daily living, provide a good warm-up for joints and musculature prior to the exercise session, and potentially decrease the risk of injury of the low back and knee joint (4). The sample program consists of various bodyweight movements that focus on developing strength in the lumbo-pelvic hip complex. This program is designed to be completed three days per week (M/W/F) at one of two selected time periods to maintain consistency. Every session should consist of a warm-up that incorporates foam rolling the calves, hamstrings, quadriceps, IT band, and glutes for 30 s each, and dynamic stretching (e.g., inchworm, lateral hurdle step drill, spiderman with rotation, and lateral hacky sac for internal/external rotation), as well as a cooldown with similar movements. The program increases in intensity by progressing the exercises

weekly, increasing the repetitions, or adding external resistance (a resistance band is a common implement for increasing external resistance). Table 1 contains a sample six-week lumbo-pelvic hip complex strengthening program.

TESTS TO MEASURE PERFORMANCE

Assessment of performance improvements can be done through Vertec explosive power assessment to measure vertical jump height, as well as a Landing Error Scoring System (LESS) jump landing mechanics evaluation. The Vertec assessment is a commonly used field test for assessing a person's maximum vertical jumping ability. The LESS has been shown in clinical settings to be both a reliable and valid predictor (intraclass correlation = .84, standard error of mean [SEM] = .71) of high risk movement patterns during jump landing tasks (5). Both assessments should be conducted in a controlled setting and serve as baseline measures for maximum vertical jumping ability and landing mechanics quality. At the end of the training period, all participants should be assessed once again to check for changes in both Vertec height as well as total LESS score. For use with this sample training program, each test should be administered at pre- and post-intervention, and each participant should be assessed on the same day of the week (i.e., if pre-intervention was on a Monday, then post-intervention should also be on a Monday). Then each participant completes a brief warm-up (e.g., on a stationary bike) for five minutes. After the warm-up, each participant begins with the Vertec test followed by the LESS with adequate time for recovery between the tests. Below is a basic explanation of the administration of the two tests.

VERTEC

Reach height is determined before performing any jumps by having each participant reach as high as possible with their dominant arm. Once the reach height is recorded, the Vertec is adjusted to accommodate a predicted jump height based on the individual's reach. If necessary, the administrator then explains how the movement should be performed, and then demonstrates the movement. Each participant should complete three trials with about a 30-s break between each jump (3). This test is a reliable and valid measure of vertical jump height (3).

LESS

The LESS requires the participant to jump off of a 12-in plyometric box, land on a tape line marked at 50% of their height, jump back up in the air (maximal vertical jump), and then land once more. The quality of the jump land task is assessed with the aid of two-dimensional video analysis from both an anterior and lateral vantage point using a high speed camera set at 120 frames per second. This test is a reliable and valid measure of jump landing biomechanics (5).

CONCLUSION

Both the Vertec vertical jump and LESS evaluations can be used to identify differences between pre- and post-intervention scores to determine the efficacy of the training program. As with any exercise program involving human participants, there are many limitations that can potentially alter the results. For example, previous research has identified that, biomechanically speaking, females tend to land from a jump with riskier landing strategies and less neuromuscular control when compared to males (9).

Given anatomical, neuromuscular, and strength differences between males and females, the program design used in this six-week sample training program may be more suited for females. The first two weeks of the program are designed to be intentionally foundational so that a more deconditioned general population will have no problem starting the program. These movements should be progressed over time when clients become more proficient in performing them; however, it may be too easy in the beginning, which could alter the progression of the exercises. In addition, the exercises in weeks five and six of the program are intended to help new clients learn complex movement patterns such as squatting and deadlifting with proper form and mechanics. Based on these observations, this sample six-week training program should be adjusted according to each client's abilities prior to implementation in order to obtain the desired training adaptations.

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SAMPLE LUMBO-PELVIC HIP COMPLEX STRENGTHENING PROGRAM

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Tim Leszczak is an Associate Professor at Austin Peay State University. He received his Bachelor of Science degree in Accounting from Rowan University, and his Master’s and PhD from the University of Arkansas. He teaches courses on exercise science and also coordinates the Graduate Program. His research interests consist of improving function in older adults as well as exploring different exercise modalities to improve performance measures in college-aged students-athletes.

Grayson Elmore is a Clinical Instructor at Austin Peay State University, teaching in the Applied Exercise Science Concentration. He received his Bachelor of Science degree in Athletic Training from King University and Master of Education from Bethel University. He is currently pursuing his Doctoral degree at Rocky Mountain University of Health Professions. He has worked clinically with a variety of clients specializing in post-rehabilitation and medical fitness. His research interest includes the use of movement assessments as injury prediction tools and program design considerations for medical fitness populations.

TABLE 1. SAMPLE SIX-WEEK LUMBO-PELVIC HIP COMPLEX STRENGTHENING PROGRAM

WARM-UP	Foam Rolling • 30 s each area (calves, hamstrings, quadriceps, IT band, and gluteals)
	Dynamic Stretching • Lateral hurdle step drill (Figures 1 – 3) • Inchworm (Figures 4 – 6) • Spiderman with rotation (Figure 7) • Lateral hacky sack (internal and external rotation) (Figures 8 – 9)
COOL-DOWN	Foam Rolling • Same areas as warm-up
WEEK 1	3 rounds of A and B A1: Double-leg assisted bridge x 15 (Figure 10) A2: Prone plank x 15-s hold (Figure 11) A3: Prone swimmer x 15 (Figure 12) A4: Supine chop x 15 (Figures 13 – 14) B1: Side-lying clamshell x 15 (Figure 15) B2: Side plank x 15-s hold (Figure 16) B3: Supine lift x 15 (Figures 17 – 18) B4: Dead bug x 15 (Figure 19)
	3 rounds of A and B A1: Single-leg bridge x 10 (Figure 20) A2: Prone plank with hip extension x 10 (Figure 21) A3: Prone swimmer to prone plank x 10 A4: Supine chop x 15 B1: Resisted side-lying clamshell x 10 (Figure 22) B2: Side plank with leg raise x 10 (Figure 23) B3: Supine lift x 10 B4: Resisted dead bug x 10 (Figure 24)
WEEK 2	

- WEEK 3**
- 4 rounds of A and B**
 A1: Quadruped beast (knees off the ground) with hip extension x 15 (Figure 25)
 A2: Quadruped donkey kick x 15 (Figure 26)
 A3: Quadruped hip hurdle x 15 (Figures 27 – 29)
- B1: Quadruped fire hydrant x 15
 B2: Quadruped bird dog x 15 (Figure 30)
 B3: Prone plank with shoulder tap x 15 (Figure 31)

- WEEK 4**
- 4 rounds of A and B**
 A1: Resisted quadruped beast with hip extension x 10 (Figure 32)
 A2: Resisted quadruped donkey kick x 10 (Figure 33)
 A3: Quadruped hip hurdle x 10
- B1: Resisted quadruped fire hydrant x 10 (Figure 34)
 B2: Resisted quadruped bird dog x 10 (Figure 35)
 B3: High plank with shoulder tap x 10 (Figure 36)

- WEEK 5**
- 3 rounds of A, B, C, and D**
 A1: Assisted hip hinge x 15 (Figures 37 – 38)
 A2: Half-kneeling chop x 15
- B1: Reactive neuromuscular training bodyweight squat x 15 (Figure 39)
 B2: Resisted quadruped bird dog x 15
- C1: Resisted quadruped beast fire hydrant x 15
 C2: Lateral band walk (low band posture) x 15 steps each direction (Figure 40)
- D1: Half-kneeling lift x 15 (Figures 41 – 42)
 D2: Resisted dead bug x 15

- WEEK 6**
- 3 rounds of A, B, C, and D**
 A1: Resisted hip hinge x 10 (Figures 43 – 44)
 A2: Standing chop x 10
- B1: Single-leg squat x 10 (Figure 45)
 B2: Single-leg stance with three-way tap x 10 (Figure 46 – 48)
- C1: Resisted quadruped beast donkey kick x 10
 C2: Lateral band walk (low band posture) x 10
- D1: Standing lift x 10 (Figures 49 – 50)
 D2: Single-leg hip hinge with touch x 10 (Figure 51)

- KEY**
- Frequency:** three times per week
Intensity: lumbo-pelvic hip complex endurance/strength program that progresses from minimal-moderate intensity
Time: 30-min exercise session
Type: bodyweight and resistance band hip and core dominant exercises

On exercises in the program denoted with “resisted,” use stretch bands with variable resistance from light to heavy. The selection and implementation for resistance for each individual should be dependent upon their ability to execute proper form for the exercise in question; thus, resistance band selection should be adjusted as needed based upon observation from the program administrators and verbal feedback from the client.

SAMPLE LUMBO-PELVIC HIP COMPLEX STRENGTHENING PROGRAM

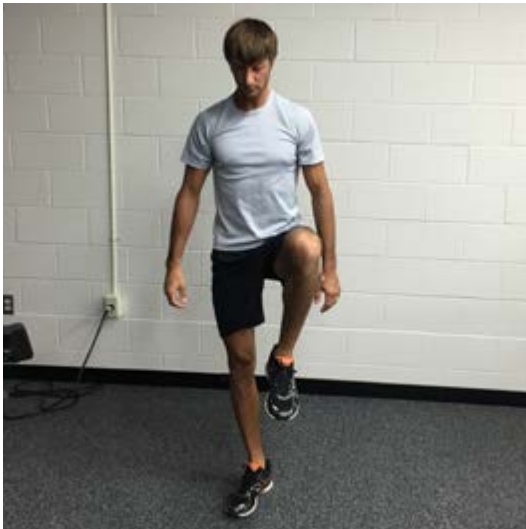


FIGURE 1. LATERAL HURDLE STEP DRILL
- START



FIGURE 2. LATERAL HURDLE STEP DRILL
- MIDDLE



FIGURE 3. LATERAL HURDLE STEP DRILL - END



FIGURE 4. INCHWORM - START



FIGURE 5. INCHWORM - MIDDLE



FIGURE 6. INCHWORM - FINISH



FIGURE 7. SPIDER MAN WITH ROTATION



FIGURE 8. LATERAL HACKY SACK - EXTERNAL ROTATION



FIGURE 9. LATERAL HACKY SACK - INTERNAL ROTATION



FIGURE 10. DOUBLE-LEG ASSISTED BRIDGE

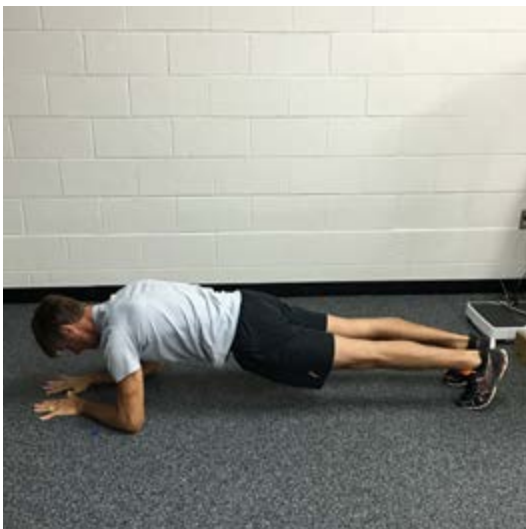


FIGURE 11. PRONE PLANK

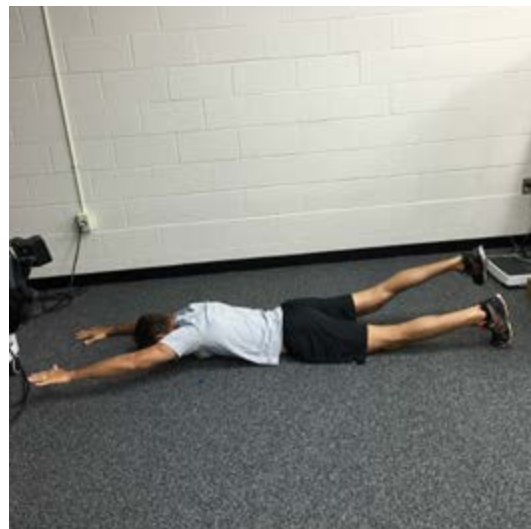


FIGURE 12. PRONE SWIMMER

SAMPLE LUMBO-PELVIC HIP COMPLEX STRENGTHENING PROGRAM



FIGURE 13. SUPINE CHOP – START



FIGURE 14. SUPINE CHOP – END

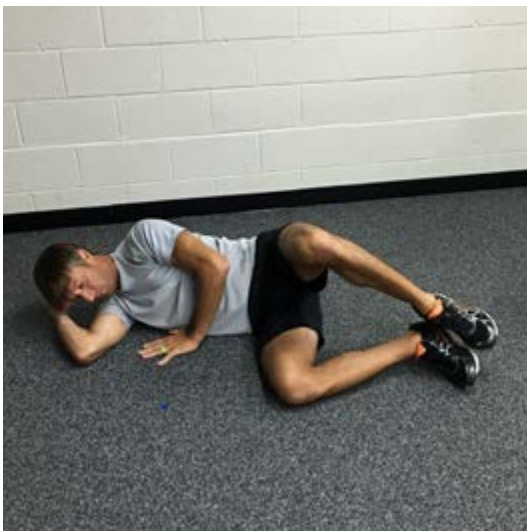


FIGURE 15. SIDE-LYING CLAMSHELL



FIGURE 16. SIDE PLANK



FIGURE 17. SUPINE LIFT – START



FIGURE 18. SUPINE LIFT – END



FIGURE 19. DEAD BUG



FIGURE 20. SINGLE-LEG BRIDGE



FIGURE 21. PRONE PLANK WITH HIP EXTENSION

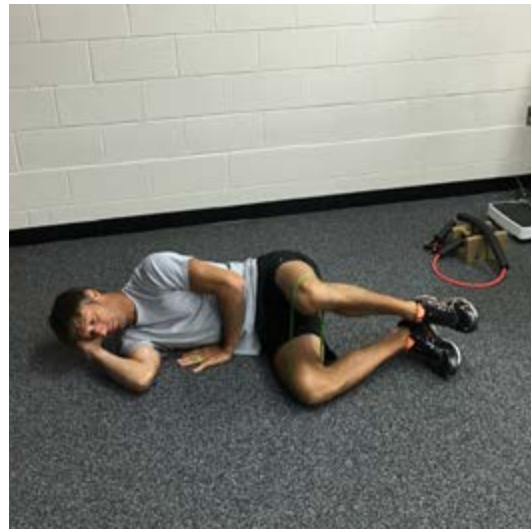


FIGURE 22. RESISTED SIDE-LYING CLAMSHELL



FIGURE 23. SIDE PLANK WITH LEG RAISE



FIGURE 24. RESISTED DEAD BUG

SAMPLE LUMBO-PELVIC HIP COMPLEX STRENGTHENING PROGRAM



FIGURE 25. QUADRUPED BEAST WITH HIP EXTENSION



FIGURE 26. QUADRUPED DONKEY KICK



FIGURE 27. QUADRUPED HIP HURDLE - PART 1

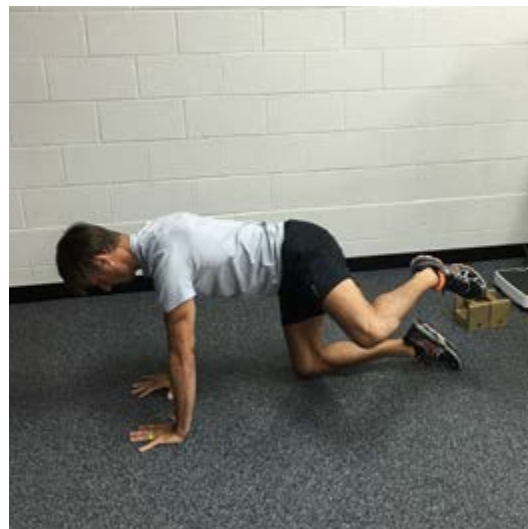


FIGURE 28. QUADRUPED HIP HURDLE - PART 2

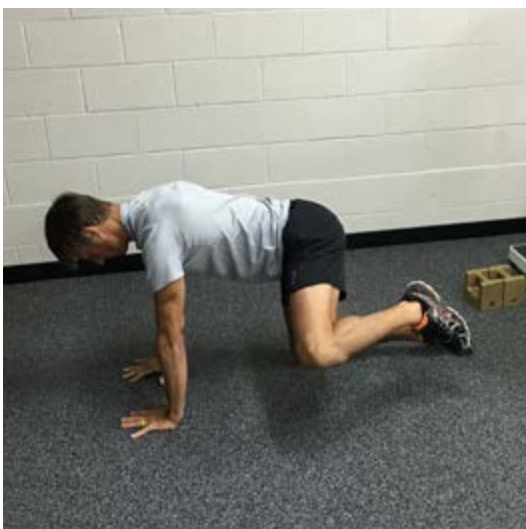


FIGURE 29. QUADRUPED HIP HURDLE - PART 3



FIGURE 30. QUADRUPED BIRD DOG



FIGURE 31. PRONE PLANK WITH SHOULDER TAP

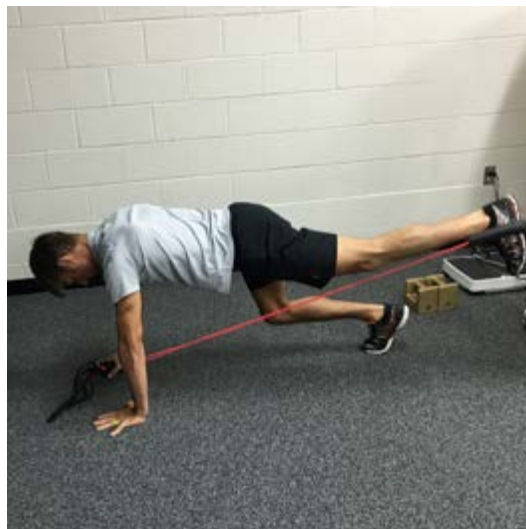


FIGURE 32. RESISTED QUADRUPED BEAST WITH HIP EXTENSION



FIGURE 33. RESISTED QUADRUPED DONKEY KICK



FIGURE 34. RESISTED QUADRUPED FIRE HYDRANT

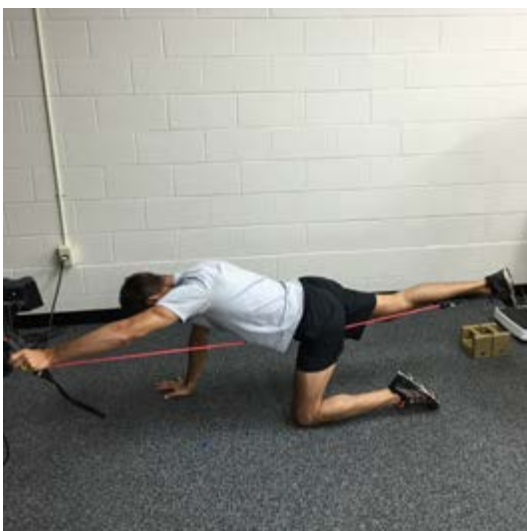


FIGURE 35. RESISTED QUADRUPED BIRD DOG

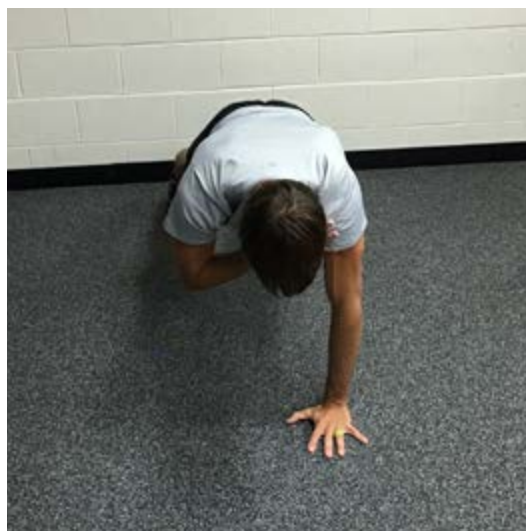


FIGURE 36. HIGH PLANK WITH SHOULDER TAP

SAMPLE LUMBO-PELVIC HIP COMPLEX STRENGTHENING PROGRAM



FIGURE 37. ASSISTED HIP HINGE – START



FIGURE 38. ASSISTED HIP HINGE – END

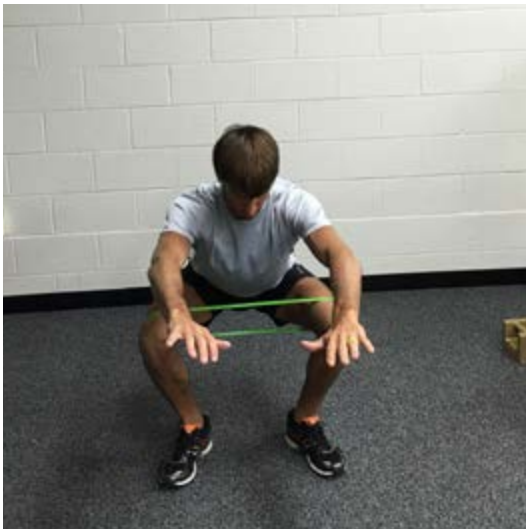


FIGURE 39. REACTIVE NEUROMUSCULAR TRAINING BODYWEIGHT SQUAT

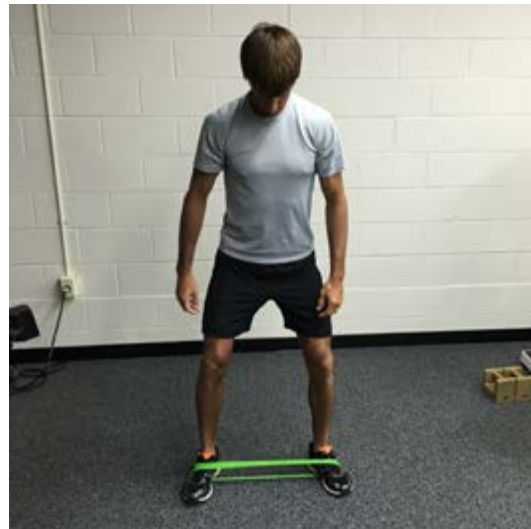


FIGURE 40. LATERAL BAND WALK (LOW BAND POSTURE)



FIGURE 41. HALF-KNEELING LIFT – START



FIGURE 42. HALF-KNEELING LIFT – FINISH



FIGURE 43. RESISTED HIP HINGE – START



FIGURE 44. RESISTED HIP HINGE – END



FIGURE 45. SINGLE-LEG SQUAT



FIGURE 46. SINGLE-LEG STANCE WITH THREE-WAY TAP – START



FIGURE 47. SINGLE-LEG STANCE WITH THREE-WAY TAP – MIDDLE



FIGURE 48. SINGLE-LEG STANCE WITH THREE-WAY TAP – END

SAMPLE LUMBO-PELVIC HIP COMPLEX STRENGTHENING PROGRAM

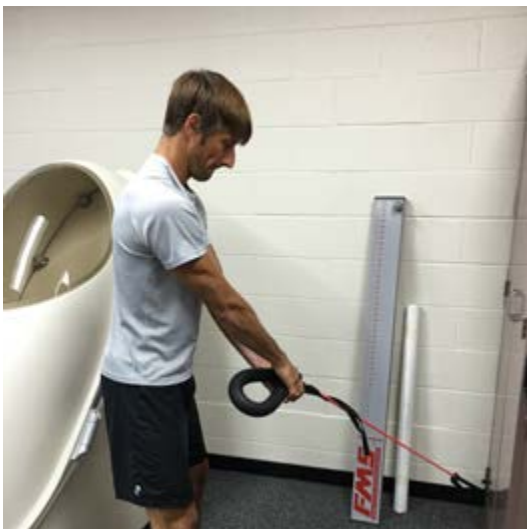


FIGURE 49. STANDING LIFT - START



FIGURE 50. STANDING LIFT - END

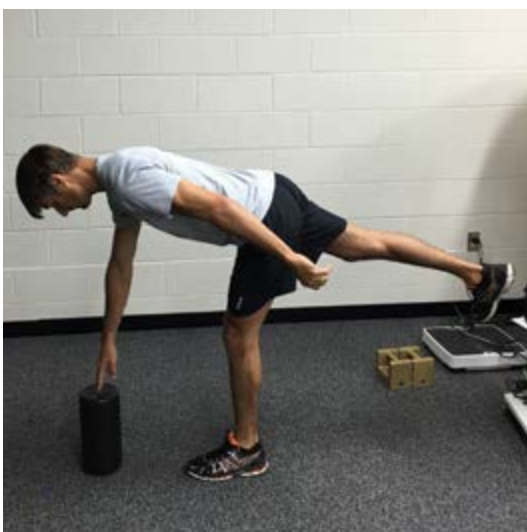


FIGURE 51. SINGLE-LEG HIP HINGE WITH TOUCH

DON'T GET LOST *In the Woods*



DON'T LOSE YOUR
WAY ON THE TRAIL
TO RECERTIFICATION.
RECERTIFY NOW.

DEADLINE:
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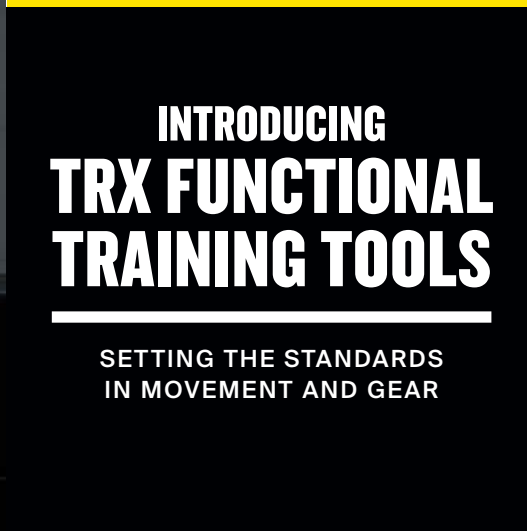
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