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Energy Balance in Perspective

The Core of Motivation

AND MORE!

CEC Self Test Packet: June 2016

NFPT SELF- TEST: JUNE 2016 EDITION

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Energy Balance in Perspective

Authored by NFPT Staff Writer

"All things in moderation." This oft-cited phrase is believed to date from ancient times and remains relevant today.

Take for example, the principle of energy balance used in diet in exercise that calories in should be in some proportion--depending on one's fitness goals--that approaches parity.

When we consider that the physical energy expenditure in the United States has fallen markedly over the past century while the availability of easily obtainable high calorie foods and beverages has skyrocketed, the concept of energy balance is all the more relevant. In one recent study, researchers suggest the use of strategies that pair food and beverage intake with a higher level of energy expenditure than is typical in today's society. This, the researchers say, would allow the biological system that regulates body weight to perform more effectively.

When we consider that many people burn up about 200-300 calories in a 30-minute bout of moderate exercise, the number of calories contained in say, a sports drink, can seem pretty ominous.

Yet, replenishing energy and nutrients in a post-workout setting is still a good idea. The more intense the resistance workout, the greater the need for protein, for example. Not ingesting an appropriate meal shortly after the session, which would otherwise provide the energy required by the muscles that were just worked, will result in continued catabolism and an undesirable reduction in tissue energy and volume. This condition is a detriment to reaching any fitness goal because it reduces lean mass.

Minute for minute, more energy is expended and consequently more calories are burned during intense exercise intensely rather than moderate exertion. In other words, running uses more calories than does walking for the same interval. Whether that is desirable depends primarily on someone's present state of physical conditioning and health goal or goals.

Exercising at higher intensities might also reduce appetite for some time after the workout, unlike less intense exercise levels. In a recent study, it was found that men who rode stationary bicycles intensely for 30 minutes ingested significantly fewer calories afterward than when they rode at moderate intensity for the same amount of time. They also exhibited reduced lower blood levels of ghrelin, a hormone known to stimulate appetite.
During intense exercise, the body turns to calories from carbohydrates. But when performing at a more unhurried pace, energy demands are lower and the body can turn to the slow but steady fuel source: fat. According to one study, exercising at an intensity of about 65 percent to 80 percent of your maximal heart rate (HRmax), or a pulse rate of about 105 to 130 beats per minute, maximizes the amount of fat burned during a workout, although it involves less caloric expenditure per minute than exercise performed at more intense levels.

For achieving and maintaining an optimal level of health, perhaps we need look no further than the concepts of restraint and common sense, or as the ancients are reputed to have so eloquently put it: "All things in moderation."

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Influence and Help More People With The Stages Of Change

Authored by Bev Hosford

Change is in the air as the new year approaches. New Year's resolutions circle our thoughts. Many people have the best intentions, but don't follow through. How do you know if someone is serious about their desire to change?

You can't predict the future, but you can arm yourself with tools to give the right kind of nudge to those that need it.

The Stages of Change were developed by Prochaska and colleagues to categorize a person's readiness for change. Being able to identify which of these five stages a person is in helps you speak directly to them where they're at and be a more effective influencer.

Pre-contemplation

"Exercise, yeah that's good stuff. It's not for me. I get the mail each morning, that's enough." **The cons outweigh the pros for this person and they're not likely to make any changes to their lifestyle.**

What You Can Do

RUN! Just kidding! **Don't give up on them, but don't waste too much breath either. When you do cross paths, listen more than you talk. People drop clues and hints if you listen instead of give advice and opinions. They might have grandchildren that they can't keep up with or have a health issue that interferes with their life.**

Connecting exercise to these deeper goals is your best chance of making a difference. Providing them with facts that they can specifically relate to is the best way to win them over and get them *contemplating*...

Contemplation

"I'll start exercising next month, when I get back from my business trip." They have good intentions, but it's all talk - without action. They view themselves as someone who should exercise, but there are just as many pros as cons

What You Can Do

Talk to them about how regular exercise would make them feel. Say "Have you exercised in the past? How did it make you feel?" Imagination and visualization are powerful tools. Work to tip the scale so that the pros outweigh the cons by pairing it with their emotions.

Preparation

"I bought new running shoes so I can get back on track. Did you know I used to run five miles a day in college?" These people are similar to *contemplators*, but have taken an extra step, making them more ready for change. They might go for an occasional walk around their neighborhood, but not consistently.

What You Can Do

Encourage them to be more routine (30 minutes/day). Help them identify time in their

schedule to start exercising or find a buddy to workout with. Have them keep an exercise journal or keep track of their daily steps (most smart phones can do this). Raise their awareness about their consistency.

Keeping track or having an accountability partner are two proven methods for this.
If they do a trial session with you, don't make it so hard that they can't walk the next day. They need to succeed and not have positive experiences, not negative ones. Their confidence about exercising may not be as high as their intention.

Action (most personal training clients)
"I've been working out at your gym for five weeks. I want to bump it up a notch by getting a personal trainer." These people have been exercising for less than six months and they're highly motivated. However, 50% of people dropout during the first six months, it's a fragile time. The goal is to get them past that mark into the next stage of *maintenance*.

What You Can Do
They'll buy sessions from you with ease, but don't get over-excited or think they're a client for life because of their enthusiastic intentions. Adapting a new habit is challenging, so check in frequently.

Be careful that they don't over-commit or over-do it. Find out what motivates them and keep them focused on that. Set achievable goals with them. Pay careful attention to any cues that they'll relapse back into sedentary behavior, such as canceling sessions and making excuses about eating habits. Address these immediately.

Maintenance (we all want these clients)
"I've been working out since college. I need to mix it up and had a personal trainer in the past. Are you taking new clients?" This is every personal trainers ideal client, motivated and committed.

Their #1 setback is injury, with schedule interruptions being a close second.

What You Can Do
Tap into their personality type, what their needs are and keep them interested. **Help them see potential barriers such as an upcoming holiday party or vacation. Emphasize injury prevention and make sure they aren't over-training.**

Time For Action!
Now it's time for you to practice these skills. Analyze the people in your life and see if you can pin point their stage of change. Transform your conversations according to each person's phase. It'll become more natural as you go.

Don't Let Your Training "Run Down" Vitamin Stores

Authored by an Cathleen Kronemer

"Tell me what I should be eating!"
At some point during our careers, we have all heard this query from motivated clients. As a health coach as well as a trainer, I frequently assist clients in designing meal plans appropriate for their goals as well as their lifestyles. Most clients claim that they wish to clean up their diets, and of course it can be accomplished. However, as we are well aware, desire and contemplation are not the same as integrating and taking action.

Change is tough for so many individuals, myself included. If a goal is going to be achieved, especially one heading toward improvements in athleticism or body composition, wherever the client's status quo lies will have to be altered. When addressing an individual's nutritional requirements for adding lean muscle mass, we are all well versed in the need for adequate protein intake, timing of carbs before and after strength -training sessions, and the importance of adding healthy fats and eliminating saturated fats. This is a typical framework for embarking on any new, healthier lifestyle.

Clean meal plans go much deeper than simply considering micronutrients. Essential vitamins and minerals are often lacking in a client's current diet, and this too must be addressed. Since every activity level utilizes the body's supply of such elements differently, the individual's preferred method of exercise comes into play. Research has indicated that runners in particular often suffer from vitamin deficiencies without even realizing it. Simply adding clean calories is often not enough. Recently, the field of Nutrition Science has cast a light on the vitamin needs of athletes and the consequences of deficiencies. A recent study from the University of Oregon found that such decreased levels were common in athletes and runners, and that these deficiencies will most likely diminish athletic performance over time.

Before being told by a doctor or dietitian or health coach that deficiencies need to be addressed, runners typically complain of the following symptoms:

- Reduction in performance energy
- Perception of increased effort being spent during training
- Taking longer to recover between runs
- Becoming prone to infections and injury
- Injuries taking longer than usual to heal

While many seasoned athletes will often attribute these symptoms to merely "overdoing it" and choose to take a few extra rest days, these issues will flare up again once regular training is resumed. Few if any runners will first and foremost jump to a conclusion of lacking essential vitamins!

Some of the most common deficiencies seen in runners are low levels of iron, magnesium, Vitamin D, Vitamin B12, and zinc. Often an over-the-counter multivitamin designed for mainstream use falls painfully short of the demands that a distance runner places on his body. By making a few key shifts while still focusing upon healthy eating, these deficiencies can rectify themselves.

The function of iron is to help the red blood cells deliver oxygen to all parts of the body. Iron also plays a vital role in the body's production of energy. As one can imagine, depleted iron stores lead to overall body weakness, shortness of breath, and in severe cases, heart palpitations. All of these can spell disaster for a distance runner. Fortunately, there are many clean food sources that provide a generous helping of iron. In addition to red meat (especially liver), nuts, beans and dark green leafy vegetables will fit the bill, which is comforting for many vegetarian runners whose diets tend to consist largely of legumes and variations on a dark green leafy theme!

Vitamin D controls phosphate and calcium in the body, helping to regenerate bone mass and strengthen the body's current bone integrity. A review published in the journal Molecular Aspects of Medicine, December 2008, revealed that Vitamin D actually increases the size of fast-twitch muscle fibers as well as muscular strength. Many outdoor distance runners operate under the assumption that training in adequate sunlight is sufficient enough for the body to produce good amounts of Vitamin D. My husband is one of those runners diagnosed with low Vitamin D levels, much to his surprise! Easily remedied, to ward off achy muscles and joints, we began to include greater quantities of foods such as salmon and eggs. As it turns out, mushrooms contribute one of the highest amounts of Vitamin D of all food sources.

Similarly to Vitamin D, magnesium is responsible for the health of a runner's bone density. It also is a key player in the process of turning food into usable energy. Cramps, muscle spasms and dizziness are among the more commonly reported symptoms of magnesium deficiency, three components that will quickly sideline any runner. By including whole grain bread, brown rice, dairy products, fish and nuts in a weekly meal plan, magnesium stores should remain in an ideal range.

Vitamin B12 deficiencies are fairly common, even in non-athletes. Contributing to the well being of blood cells and nerve cells, low levels of Vitamin B12 may result in weakness, fatigue, anemia, and frequently depression as well. Since these attributes are vital in human performance, especially for runners, it may be prudent to include more salmon, cod, meat, and fortified cereals. Vegetarians and vegan runners are very susceptible to deficiencies in this vitamin, so close attention must be paid to the adjustment and adequate intake of plant sources of Vitamin B12.

Zinc is one of those elements that often slip through the cracks of a typical healthy diet. While helping to boost the body's immune system, zinc also facilitates the processing of macronutrients. Runners who become aware of a dip in appetite, an increase in hair loss, or suddenly being unable to fight one infection after another may be experiencing a zinc deficiency. Meat, dairy products, and shellfish contain potent amounts of zinc, and may be easily incorporated into a runner's clean diet.

In addition to the aforementioned vitamins, Essential Fatty Acids (EFA's) are vital for optimal athleticism. Since the body is incapable of manufacturing its own supply of omega-3 EFA's, these must be obtained through food sources. Lack of inclusion in a runner's diet of foods rich in EFA's can cause depression and loss of memory. While these symptoms by themselves may not immediately signal alarm for a runner, depression over the course of time can lead to decreased levels of motivation. An easy nutritional remedy is to add fatty

fish to the menu, such as salmon and tuna (my personal favorites). If your athletic client has a fish aversion, EFA's may also be obtained through the consumption of walnuts, flax oil, and ground flax meal.

Having never considered myself to be a runner, preferring bodybuilding as my hobby of choice, I was surprised when a client asked me to join her in running a 5K. I trained for 3 months, and the event was held December 13th. While doing the training runs 3 times a week, in addition to my already full schedule of teaching aerobics, personal training, health coaching and bodybuilding, it was fascinating for me to observe my body's reaction to this increase in caloric expenditure. Some days I was very sore, and other days I felt fabulous. However, I did need to alter my meal plan to include more of the foods listed above, and in greater quantities. Much to my surprise --- really stunning to me, actually --- I completed my very first 5K in about a half hour, in the rain. While I still cannot consider myself to be a runner, I conquered a goal I had set for myself, and learned much about the human body's nutritional requirements in the process.

Time to lace up!

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Rotator Cuff: Anatomy and Exercises

Authored by Bev Hosford

The rotator cuff is a group of four muscles that all attach from the superior (upper) humerus to the scapula bone in different places. Three of the muscles rotate the humerus externally (outward) and all attach to the greater tubercle. One of the muscles rotates the humerus internally (inward) and attaches to the lesser tubercle.

Anatomy and Body Awareness

SITS is the acronym that many personal trainers use to remember the four rotator cuff muscle names. Now, it's time to go deeper and learn the exact attachment sites and how to feel them on your body. When you know where muscles attach, you can more accurately cue clients during rotator cuff exercises, by showing them exactly where to feel it.

Teaching your clients the attachments ensures they're strengthening the correct muscles and creates body awareness. This allows you both to communicate better. When they know where a muscle attaches, can visualize it and feel it, this enhances their strengthening efforts.

It also increases your credibility and confidence as a personal trainer!

Get In The Groove with Bony Landmarks

Muscles attach to bony landmarks - on bones - through tendons. Find your bicipital groove by placing your finger tips on the superior (upper), anterior (front) of your shoulder. Rotate the humerus internally (inward) and externally (outward) until you find the biceps tendon and the groove. It'll feel like a cord running between two bumps of bone. You might need to move your fingers around to find it. Keep rotating the humerus (arm) slowly until you do.

You can also flex your bicep and follow the muscle up to the tendon to find the groove.

Lesser tubercle of humerus - medial (toward armpit) to the groove.

Greater tubercle of humerus - lateral (away from armpit) to the groove.

These two bony bumps you feel are where one end of all the rotator cuff muscles attach. Once you locate them on yourself, then you can guide clients to know where they are also.

Connect to the Muscle Attachments

We'll start with the **one internal rotator:**

Subscapularis

Attachments

Subscapularis fossa of scapula. This is the anterior surface of the scapula, it faces the rib cage. «Sub» like submarine. It›s the under-side of the scapula.

Lesser tubercle of humerus. This is the smaller protuberance of two that sit on either side of the bicipital groove (see above). It›s medial to the groove and smaller.

Now, the **three external rotators**:

Infrapspinatus

Attachments

Infraspinatus fossa of scapula. This is the posterior surface of the scapula, it's the other side of scapula from subscapularis. It's below the spine of scapula, which is what "infra" means - below.

Greater tubercle of humerus. This is the larger protuberance of two that sit on either side of the bicipital groove (see above). It›s lateral to the groove and larger.

Teres Minor
Attachments

Lateral/Superior border of scapula. The glenoid fossa is where the humeral head meets the scapula directly through cartilage. Just inferior (below) to it, on the outer ridge of the scapula is where the triceps attaches, just inferior to that is the teres minor attachment.

Greater tubercle of humerus. See description above.

Supraspinatus
Attachments

Supraspinatus fossa of scapula. This is the superior surface of the scapula, it's above the spine of scapula, just like the infraspinatus is below the spine of scapula - hence "supra". It's a hollowed out area where the muscle attaches and looks like a half pipe for snowboarding or skateboarding.

Greater tubercle of humerus. See description above.

Common Mistakes With Rotator Cuff Exercises
#1 **Too much motion.** When you externally rotate the humerus to its extreme, it'll stop and the scapula will then start moving. Trapezius and rhomboids will contract to make this happen. It'll reduce the amount of strengthening for the rotator cuff.

#2 **Too much resistance**. If you use too much weight, the body will recruit other, stronger and larger muscles to obtain the movement. This might land up being more scapular movement than humeral movement and is taking away from the goal of strengthening the rotator cuff.

#3 **Moving too fast.** In order to know if #1 or #2 is happening, you have to go slow through the motion.

Benefits of Strengthening The Rotator Cuff
The rotator cuff muscles stabilize the humeral head onto the scapula. When strengthened properly, they work more effectively. If they're weak, scapula-humeral rhythm gets off track and can cause injury to the delicate structures around the gleno-humeral joint.

Bonus Fact: The supraspinatus muscle assists with humeral abduction (away from midline), while the other three muscles assist with humeral adduction (closer to midline).

Bonus Tip: The best way to learn the attachments is on a partner. Explore outside =of work, so you feel comfortable. Have the partner do a rotator cuff exercise while you palpate and feel for the tendons at the attachment sites, on the body landmarks. Once you feel them on a partner, it'll be easier to find them on clients with confidence.

Why Detox is Required for Homeostasis Pt. 1

Authored by David Brancato

The purpose of this article is two-fold, first to review the fact that we live in a toxic environment and that fat cells are used as a repository for toxins; second to understand the need for detoxification in order to sustain homeostasis, i.e. health. One of the biggest misnomers is that an athlete who trains and burns thousands of calories on a daily basis can be indiscriminate on the calories they allow to enter their bodies, that is calories from hormone and antibiotic treated meats, food cooked in plastics, genetically modified foods and the like. Such thinking will lead to cellular death and all disease begins at the cellular level. Remember Roy Jones' (champion boxer) statement, 'I will not let any bad thing enter my body'. Therefore to follow are excerpts from my previous articles along with an understanding of the proper way to detox the body, leading the cellular heath and in turn to overall health.

Energy within the body, the ability to perform, to function, to live, where is its origin? Biochemically it comes from Adenosine triphosphate (ATP). Where is ATP manufactured? It is manufactured within a cells organelle known as the mitochondria. The manufacturing process within the mitochondria starts with the Citric Acid cycle, a complex biochemical production enzymes, election transport, substrates that generate Acetyl-CoA, the entry molecule for the Citric Acid cycle. The biochemistry of the Citric Acid cycle is structured under oxidative phosphorylation, electron transport, chemiosmotic gradient, ATP synthase, beta oxidation.[1]

The feeding of the Citric Acid Cycle is a basic, nutritional approach to ensuring that the components of energy production are available. The Citric Acid Cycle is dependent upon :

- *Vitamins: B-1, B-2, B-3, B-5, C, D3, E*
- *Proteins:carnitine, Cysteine, Tryptophan, Glutamine, Histidine, Glutamic acid, Valine, Isoleucine, Methionine, Proline, Tyrosine, Phenylalanine, etc.*
- *Mineral: Iron, magnesium, Zinc, Phosphorus, Manganese, Sulfur, Potassium, Sodium, Selenium*
- *Nutrients: Lipoid Acid, CoEnzyme Q10, Alpha Ketogluterate*[1]

The energy production within the mitochondria becomes impaired if cell damage occurs. Cellular damage originates with inflammation of the cells surface, which results from the exposure to xenobiotics, improper nutrition, oxidative stress. When this happens, meaning low energy one is likely to jump start with an energy drink, which only compounds the problem and does not address the root cause of depleted energy.

Before presenting renowned detoxification protocols let's have a refresher on my previous articles that defined xenobiotics and the body's defense mechanism to capture the toxicants.

The following is an excerpt from my article entitled, **Challenges to a Healthy Life Style Causes - Exposure to Xenobiotics, Additives to Foods, Side Effects of Pharmaceuticals**[2]:
"Your body's innate intelligence is designed to remove substances that are of no physiological worth. However, no two people are alike respective to symptom, cause or recovery. Any symptom can be the manifestation of chemical sensitivity with any target organ being vulnerable. Genetic polymorphism means we look different from each other on the outside; however, we are biochemically and genetically unique on the inside. There is a genetic predisposition for some individuals for failure, based on the absence of necessary enzymes. For example, inborn errors like phenylkentonuria – the enzyme that is necessary to metabolize phenylalanine is missing, causing the amino acid to build up causing death. Another example is the absence of aryl hydroxylase hydratase (AHH) causing the inability to detox debrisoquine (antimalarial drug) that leads to Parkinson

disease.

In addition to inborn deficiencies to our enzyme network, there is enzyme depletion caused by continued exposure to toxins, commonly known as xenobiotics which are common to our food and environment. What is a xenobiotic? A **xenobiotic** is a foreign chemical substance found within an organism that is not normally naturally produced by or expected to be present within that organism. Xenobiotics will engulf metabolic pathways containing necessary enzymes to detoxify the material. Competition for these enzymes will lead to back up of toxins which in turn attack proteins and other enzymes, leading to cell death, followed by organ death, leading to system death and overall death.

Enzyme deficiencies and/or depletion will lead to six (6) physiological stages that cascade with one another leading to disease. (1) Spreading Phenomenon means that individuals become reactive to xenobiotics that never before bothered them. For example, brain fog resulting from exposure to pesticides. The allopathic community will treat brain fog while completely missing neurological and endocrine damage related to the original exposure/dysfunction. (2) Adaptation involves the endoplasmic reticulum. Within the cell membrane there is a chain of molecules known as Cytochrome P-450. These chemical groupings attach to the xenobiotics to increase size, polarity and solubility. This alteration of the xenobiotic will allow them to be dragged from the body through our excretory pathways. However, this enzyme network will become depleted when the body is overwhelmed with continued exposure to xenobiotics, leading to a buildup of toxins. (3) Certain toxins will cause enzyme induction which involves energy expenditure. The need for more enzymes means that the body does not react as it first did causing a greater load of the toxin to exhibit the same symptom. The increase in energy expenditure causes imbalances to homeostasis. In other words, there becomes a lack of innate energy needed to carry out normal physiological functions. (4) De-adaptation is when xenobiotics will overwhelm the detox-enzymatic pathways. Not completely metabolized, the xenobiotic will cause a symptom that was never before elicited. For example, glutathione is used in detoxification and requires the amino acids cysteine and lysine. Too much disappearance of glutathione with cysteine leads to reduction in taurine. The disappearance of taurine is associated to recalcitrant conditions of inflammation, infection and heart problems. (5) Bipolarity, which means the toxin will first cause stimulation, then depression. For example, alcohol may lead to an excitement reaction, but when it is metabolized to the aldehyde depression occurs. Finally, (6) the Switch Phenomenon that causes the physician to be stumped because upon exposure to the xenobiotic the affected target organ switches from one to another. For example, an asthmatic person developing cardiac abnormalities or irritable bowel syndrome (IBS), meaning one disease becomes active while the other is quiescent.

There are three (3) categories of substances that lead to physiologic impact: (1) work and environmental toxins, (2) food additives, such as preservatives, color and taste additives; and (3) pharmaceuticals.

Environmental toxicants include: plasticizers (TMA, Trimellic anhydride) which are complex antigens that impact the immune system; dry cleaning fluids that are cardio toxins; solvents which are associated with panic disorders; hydrocarbons (paint solvents, gasoline, and the like) that cause glomerulonephritis (inflammation of the kidney cortex); formaldehyde linked to fatigue and cancer; pesticides linked to brain fog (loss of concentration, poor memory, irritability and depression).

The Department of Labor's Occupational Safety and Health Administration and the Environmental Protection Agency establish safe exposure limits to chemicals found in the work place and environment, respectively. However, always inform your physician of your occupational and environmental histories.

In the category of food there is celiac disease linked to wheat intolerance (gluten); retinal

degeneration linked to MSG (monosodium glutamate); milk may contain r[Bovine Growth Hormone] that causes hypochlorhydria; and/or one's diet that includes the inappropriate combination of protein, carbohydrates and sugars, which will lead to fermentation of carbohydrates and putrefaction of proteins, causing catarrh to infiltrate the extracellular fluid.

Regarding food additives, food manufacturers have added Advanced Glycation End Products (AGE) to foods, especially in the last 50 years as flavor enhancers and colorants to improve appearance. Biomolecules function through glycosylation which occurs at defined target molecule sites. However, glycation (non-enzyme glycosylation) is the result of sugar molecule, such as fructose or glucose bonding to a protein or lipid molecule without the controlling action of an enzyme. Glycation can occur inside the body (endogenous Glycation) or outside the body (exogenous Glycation). Glycation is a haphazard process that impairs the functioning of biomolecules.

Exogenous Glycation may also be referred as dietary or preformed when sugars are cooked with proteins or fats at temperatures of 120° C (~248° F). For example, glycation results when sugars are added to products such as French fries to enhance browning. Glycation will contribute to the formation of acrylamide, a known carcinogen. AGE contribute to inflammation, retinal dysfunction, cardiovascular disease, type II diabetes. Foods with significant browning, caramelization or with directly added AGEs are proinflammatory and disease initiating compounds. Examples include donuts, barbecued meats, cake and dark colored soda pop.

Endogenous glycation occurs in the blood stream to a small proportion of absorbed simple sugars: glucose, fructose, and galactose. Fructose and galactose have ten times the glycation activity of glucose. AGEs are more reactive than the sugars they are derived from, and are implicated in many age-related chronic diseases such as:

- Type I and II diabetes (beta cell damage)
- Cardiovascular disease (endothelial, fibrinogen, and collagen are damaged)
- Alzheimer's (amyloidal proteins are side-products of reactions progressing to AGEs"

When xenobiotics overwhelm certain detoxification pathways, then they cannot be handled in the original way designed for their detoxification. What happens is that they are not completely metabolized. In other words the individual may react to a chemical that never before bothered them. When symptoms are suppressed by drugs the actual cause is not sought out, and the patient may develop other symptoms related to the original dysfunction. The allopathic physician is thus baffled as one symptom is suppressed and a new symptom emerges, possibly related to a different target organ…In other words the physician begins to doubt motive or begins to suspect sanity of the patient.

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Motivation Elevation: Training the Clinically Depressed Client

Authored by Cathleen Kronemer

Now that we are in the swing of 2016, we are no doubt observing what I refer to as "The January Effect": an influx of new members in our Fitness Centers, eager to jump-start their resolutions.

As is the case with our current clients, the majority of them come to the gym by choice. A small percentage of members are there out of guilt or because a doctor has strongly suggested they take a step in a healthier direction. We see this with new members as well as our current clients. A few even decide to join a gym in an effort to stave off the typical feelings of holiday let-down, after all the excitement of the December season is over. Such depression is common, but in most cases will be temporary.

There are always a few, however, who seem to have been "forced" into the fitness arena. These are the individuals for whom exercise doesn't come naturally, owing to a variety of circumstances. Upon engaging with these members, we might in our minds be considering them to be non-compliant, difficult, resistant, and of course, frustrating. What we may not realize is that these individuals just might be coping with clinically diagnosed depression.

As we have witnessed in our own fitness experiences, there is nothing quite akin to that endorphin high, brought on by facilitating the body's natural ability to manufacture serotonin (the feel-good chemical). Its appearance is always welcome, fueling our energy systems and flooding our brains with the magic words "Dig deeper! Keep pushing! You *can* get through this workout successfully!" Endorphins improve our natural immunity and may even reduce how our brains receive pain. This generally leads to a sense of euphoria and a positive mood.

Imagine struggling through what you perceive to be a very challenging workout. Now, imagine that same scenario with a compromised serotonergic system, the process responsible for liberating serotonin, particularly within nerve impulses. Suddenly, it dawns on you that if there are no endorphins waiting to reward you upon completion of the grueling exercises it seems easier to give up halfway through. Unfortunately, in most cases of clinical depression, this is precisely what is taking place.

The constitution of the *World Health Organization* includes the following definition: "Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity." Furthermore, this organization expects that by the year 2020, depression will have ascended to 2nd place on the ranking of "Disability Adjusted Life Years". For this very reason, research scientists and biological psychiatrists worldwide are studying optimal ways to manipulate the human serotonergic system with pharmaceutical drugs. Certainly, the plethora of medication available with a prescription is proof of their success in helping to treat depression.

Is taking a pill every morning "easier" for some individuals than the thought of walking into a gym? The answer is a resounding YES. Must treatment end with the last swallow of water and the meds before starting one's day? Fortunately, this answer is a resounding

NO. This is precisely where the role of a well-informed personal trainer comes into play. A reason for pursuing methods of elevating serotonin levels in the body arises from an increasing awareness on the part of professional clinicians that happiness and well being are important, not just as entities themselves, but also as factors protecting against mental illness. Conversely, recent studies have indicated that negative emotions were associated with increased incidences of depression and suicide.

Since it is widely accepted, and has been clearly demonstrated and documented, that exercise is capable of elevating the brain's level of serotonin, it seems logical to compare this effect with those elicited by pharmaceutical drugs. According to *Time Magazine*, "Molecular biologists and neurologists have begun to show that exercise may alter brain chemistry in much the same way that antidepressant drugs do -- regulating the key neurotransmitters serotonin and norepinephrine." In the United Kingdom, the National Institute for Health and Clinical Excellence published a guide regarding the optimal ways in which a physician may consider the treatment of depression. The guide recommends addressing mild clinical depression with various strategies, including exercise rather than antidepressants, since the risk–benefit ratio for antidepressant use in patients with *mild* depression has not proven to provide a tremendous benefit. Some scientists have been able to show a significant shift within the hippocampus region of the brains of individuals living with clinical depression, pointing to the potentiality of exercise boosting not only serotonin levels but the actual number of serotonin-releasing cells.

In response to psychological trauma or stressful experiences, an individual living with depression and/or anxiety typically exhibits an increased secretion of stress hormones from the HPA axis (the Hypothalamus, Pituitary gland and Adrenal glands. Regular exercise helps the body to lower the amount of these circulating hormones, leading to the individual's experiencing a reduction in his/her depression and anxiety symptoms. The basis for this biochemical theory is fairly straightforward: exercise acts on the same pathway as the one being targeted by antidepressant medications in the more traditional treatment of clinical depression.

Patients who follow aerobic-exercise regimens see improvement in their depression -- improvements comparable to what is seen in patients being treated with medication. One study found that 30-minute aerobic workouts performed 3-5 times a week decreased the symptoms of anxiety and depression by as much as 50% in young adults. Furthermore, aerobic exercise appears to lessen the occurrence of severe depressive episodes.

Returning now to our new Fitness Center member, it behooves us to be vigilant and pay attention to signs and symptoms of individuals who may be suffering in this manner. Decreases in the body's serotonin levels have the potential of creating an inability to think out and execute a well-developed idea or plan, such as a training program. When working with such a client, their situation often will present itself as a loss of patience, being easily upset or annoyed, and being unable to control impulsive thoughts and actions. When a clinically depressed individual does not wish to exercise, he or she simply will not engage; the brain is sending the signal to stay on the couch all day instead. Remind yourselves that this is not your doing but rather the illness dominating your client.

Developing an exercise program for a client who is living with a depression/ anxiety

disorder is clearly going to veer of the usual path to which we are accustomed. Remain aware that several of the more powerful characteristics of such disorders (loss of interest, motivation and energy; overall fatigue; diminished self-worth and self-confidence; fear of movement; social anxiety) have the significant potential of interfering with participation in (and enjoyment from) exercise. Mood may also play a role in social behavior. Positive social support (such as the wonderful camaraderie found in many gyms and Fitness Centers) is one of the most studied psychosocial factors in relation to this disorder. An absence of social support is often correlated with higher levels of stress and depression. By encouraging other members to interact with your new client, you may be helping him/her to feel more comfortable socially, increasing his/her chances of slowly integrating as a member of the gym community.

When conducting an assessment prior to designing such an exercise protocol, help the new client take an inventory of his/her perceived barriers towards exercise participation. This may lead into a discussion about possible strategies that could assist him/her in overcoming these barriers (problem solving, activity planning, seeking social support, cultivating a sense of self-efficacy). Exercise has shown to possess the ability to enhance one's self-esteem and body image, thereby alleviating negative social symptoms.

Empathy, validation, praise and encouragement are necessary during all phases of training, but especially when a client struggles with ambivalence or doubts his/her ability to accomplish a desired change. Providing regular progress feedback to such clients is important. Emphasize the short-term benefits after single exercise sessions: improvements in mood and anxiety, stress level, energy level, distraction of negative thoughts, and the ability to concentrate and focus more sharply. Helping the client set realistic and achievable goals, which lead to successful experiences, generally gives the client courage to persevere. A text message or brief email sent in between appointments can serve as an uplifting and encouraging reminder that you believe in his/her ability. Knowing that a trainer is waiting for him/her and is looking forward to the workout can go a long way towards feeling of self-worth and self-efficacy.

Over the next few months, think about greeting new members and potential clients with your heart and mind before your strength and education even enter the discussion. You just may discover that some individuals don't care how much we know, but want to know how much we care.

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Why Detox is Required for Homeostasis Pt. 2

Authored by David Brancato

THE BODY'S PROTECTIVE ROLE AGAINST XENOBIOTICS

From my article on body fat we learned:[3]

As discussed earlier fat cells serve a purpose to capture excess lipids from the plasma and liver. Fat cells also serve as repositories for toxins. A group of toxins that are ubiquitous in our environment are endocrine disrupters, including but not limited to estrogen like compounds such as pesticides, polychlorinated hydrocarbons and organochloride pesticides. Fat acting as sink holes to these toxins will turn stress the liver causing the biochemical duties of the liver to become impaired.

Fat cells that act as sink holes for toxins and lipids will eventually become insulin resistant causing plasma and liver lipids to increase leading to additional fat cells, known as 'stubborn fat'. The belly is the usual area for stubborn fat to be deposited. These 'stubborn' fat cells manufacture hormones. In women adipose tissue tends to produce more testosterone resulting in increased hair growth where ladies usually do not grow hair (e.g. face). In men, the tissue produces more estrogen often resulting in gynecomastia or "man boobs." We have learned how fat functions as an energy source and its protective roles as repositories for toxins and excess lipids. But, how do we regain homeostasis where the body can get rid of its excess fat caused by its protective roles which can lead to insulin resistance that causes hyperlipidemia, diabetes and cardiovascular problems, such as hypertension. In other words, we can regain functionality of our biochemical processes mentioned above through our lifestyle and diet, allowing for efficiency where glucose is transported into the cell, having fatty acids move out of adipocytes and oxidized for energy; and, exercise programs that reduce belly fat.

An anti-inflammatory eating plan, increasing physical activity, stress reduction or elimination, and limiting exposure to environmental toxins will go a long way in the battle against belly fat. A training regiment can be coupled with carbohydrate and calorie restriction. While low carbs will reduce insulin, decreasing its anti-fat burning role, calorie restriction will cause inward energy reserves in the form of fat to be expended. However, long term restriction of calories and carbs will actually impact thyroid hormone which in turn will cause a sluggish metabolism. In effect the basal metabolic rate is reduced, reducing any effort for weight loss.

Temporary states of low insulin and negative energy balance will occur by alternating between days of high and low carbs as well as days with overeating and under eating.

DETOXIFICATION

There are effective and ineffective detox procedures. "*Fasting which causes the breakdown of the body's fat cells and their stored toxicants has limited value being that some toxicants are released into the circulation. Chelation which is the use of certain molecules and ions to bind heavy metals has shown to be very effective. Ionic foot baths which sends a current into the body to generate positive ions that then attach to negatively charged toxins to allow excretion through the foot pores has shown to be ineffective. Colonic cleansing which is designed to removed encrusted putrefied food along the*

colon cavity to improve excretion of the body's waste has shown to be ineffective. Exercise which causes the breakdown of fat cells and the release of toxins, causing them to be excreted through the respiration and sweat has shown to be somewhat effective. The use of probiotics in refurbishing the good flora to promote removal of certain toxins is somewhat effective. Shana therapy has shown to be effective in stimulating the body's excretion of stored toxins."[4]

Most gyms have a sauna, making step one to your detox regimen. The best sauna that I have become accustomed to is the Far Infrared sauna. If I assumed wrong and you do not have access to a sauna, then I suggest finding a way to get into one. Next the cleansing has to follow a specific protocol in order not to cause the circulating toxins to remain in the body. All alternative health practitioners will agree that detoxification has to occur first in the bowel, next in the liver and last in the blood. Any order other than what was just mentioned will not clear the body of the toxins. One of the renowned approaches to this method of detoxification comes from Dr. Richard Schulze. Specifically, study Dr. Richard Schulze's 30-day Intensive Cleansing and Detoxification Program published in Dr. Schulze's Natural Healing Publications at 1-877-Teach-Me (832-2463). In addition to Dr. Schulze's protocol there is a protocol defined by Dr. Colbert in his book Toxic Relief.[5] If interested and wanting to start one of these detox programs it is suggested that you consult with your alternative health practitioner. remember engaging improperly in a detox program can result in the Herxheimer reaction (described below).

A third approach that may be of interest to you is juice fasting. Knowing that the body is constantly bombarded by toxins from the food we eat, the environment and the work setting, there may be years of accumulated toxins in the body. Exercise begins the detoxification through expelling toxins via your breath and sweat. After exercise the sauna will continue the process of detoxing the body through expelling the toxins through the sweat pores of the skin. Now you are at home and you are deciding on what to eat. Juice fasting is suggested both by Dr. Schulze and Dr. Colbert.

Before a juice fast begins your diet needs to support your liver for two weeks prior to the juice fast, and longer for those that are extremely toxic. Proceeding with a juice fast without a properly conditioned liver will cause a Herxheimer reaction. This reaction is evidenced by lightheadedness, low to very low energy, inability to get a good night's rest, cold hands and feet, a coated tongue, bad breath, acne (remembering that your skin is your third kidney when expelling toxins), body odor dark urine, mucous drainage from the sinuses, lungs and intestines. Some of the aforementioned signs/symptoms are normal and are to be expected. However, extreme loss of energy is a definite pattern associated with Herxheimer reaction, signaling you to reduce the fast and ensure that plenty of filtered water is ingested, i.e. 2 to 3 quarts of filtered water.

A juice fast cannot begin without a juicer. Juicers can be evaluated by reading the information found in Dr. Schulze and Dr. Colbert's books. Next is the produce which is suggested to be organic. If organic produce cannot be found, then Dr. Sears has a protocol to remove some of the toxins from the vegetables and fruits. This involves filling the sink basin with water enough to cover the vegetables or fruit, then adding a tablespoon of unscented bleach follow by a soaking of same for 15 minutes. Remove and rinse the produce, then juice. Next is the question of what to juice. The answers are

found in the research that was performed by Dr. Walker at the Norwalk Laboratory of Nutritional Chemistry and Scientific Research in New York. The research with established juicing protocols to re-establish homeostasis and correct organ disorders can be found in Dr. Walker's book Fresh Vegetable and Fruit Juices, What's Missing in Your Body.[6]

In summary, don't be mislead by individual athletes (some gold medalists) that ingest thousands of empty calories, exhibiting poor nutrition that eventually will lead to cellular death. With cellular death comes tissue, organ and overall death. Rather, use the example of Roy Jones when he said, 'I will put no bad thing in my body". Nutritionally that is sound advice. However, this article addresses the other two avenues in which cells are exposed to toxicants. It also addresses the body's use of fat cells to act as repositories for the toxicants. Further it has directed you on how to clear the body of toxicants, and the necessity to understand the benefits of juice fasting. Last, energy can't be sustained in a toxic environment. Take control, restore energy and return to homeostasis.

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The Importance of Stretching Pt. 1

Authored by David Brancato

Stretching is the underestimated part of training. Why? Because the lack of flexibility will contribute to injury. Stretching will allow one to recover quicker, attain goals earlier and when incorporated into one's exercise routine will allow a safeguard from injury. Stretching will allow one to age gracefully, muscles work more efficiently and show signs of aging much slower.

In my sojourn as a kick boxing coach and professional trainer, approximately 40 years of experience, I have learned to treat injuries and help athletes avoid injuries. In my opinion the science of stretching has allowed the athlete to attain peak performance. Research behind the physiology of stretching has provided new insight on static stretching, allowing me to advance into a new paradigm in the field of stretching. This knowledge base was attained through the research provided by Dr. Mercola, Al Meo and Aaron Mattes. Coupled with this stretching advancement known as Active Isolated Stretching (AIS) is the work out on power plates, which will be a topic for a future article.

Before discussing AIS let's begin with some foundational principles. Safety principle number one is to warm up with light aerobic exercise before stretching. The athlete will attain better performance by introducing a stretch routine before and after exercise. Stretching before will assist in lengthening the range of movement. Stretching after exercise will relax the muscle fiber, assist in ridding the muscle of waste and allow the muscle to become more pliable. However, different therapists/trainers/kinesiologists afford stretching programs specific to their training/expertise, meaning you have to choose a stretching program that will resonate with your goal of achieving excellence.

When you hear individuals talk about bad and good stretches recognize there are too many variables to one's physique to believe these myths. One stretch could be good for one individual and not for you. For example, with my expertise in martial arts and trainer in kick boxing it was more often than not I would have a client come and ask me for training tips so they could be like Bruce Lee. When I asked them to describe their flexibility training I was disappointed in how little time they worked on flexibility.

To emulate a professional sports figure one needs to be told that strength and flexibility are critical in their training program. Further, that it is important to develop skills attuned to one's physique, recognizing physical limitations and training to move beyond limitations in order to gain excellence. In other words, use the individual's will to improve based on their physical gifting. Not everyone can kick over their head; and/or have the coordination for speed and power as Bruce Lee did. But, as I trained these individuals, they were trained to reach their potential, to excel in the movements attuned to their stature, flexibility, coordination and speed. In other words, the skill set that was developed in them made them competent with the body they were gifted with, understanding that flexibility is integral to the program for their success.

Enough about why stretching is important and an example on individuals that believe in instant success without affording time to stretching. Let's begin with the common types of stretching before introducing AIS which has been instrumental in treating muscle injuries, allowing one to regain peak performance. But, I would be remiss in this discussion if I did not afford the concept and need of stretching to the office worker, which will be discussed below.

The categories that one commonly associates with stretching are static and dynamic stretching. Static stretches will allow one to get in a specific position and hold for 30 to 40 seconds. Dynamic stretching allows for swing motions, actively increasing one's range in motion specific to horizontal, vertical and sagittal angles. It is suggested that static stretching be revisited; and for reasons discussed below I have replaced static stretching with AIS.

"Prolonged static stretches actually decrease the blood flow in tissues, creating localized ischemia and lactic acid build up, potentially causing irritation or injury of local musculature, tendinous, lymphatic as well as neural tissues." Al Meo gives the physiological reason behind the cautions on static stretching and makes emphasis to a different paradigm called AIS. "The reason for this is that when a stretch is held for longer than two seconds, a protective mechanism called "myotatic stretch reflex" is triggered. This reflex happens in your body under many normal circumstances. However in elite performance, injury rehabilitation or the desire to instill lasting changes in the body, this reflex is undesirable." " the myotatic stretch reflex is initiated (by holding stretches for more than approx. 2.5-3 seconds), the muscle being stretched will begin to contract, creating what is known as an eccentric contraction - something we do not want to happen."1

AIS was developed by Aaron Mattes. Refer to Dr. Mattes YouTube video demonstration on AIS found under: The new dynamic stretching is "Active Isolated Stretching" creator Aaron Mattes.

AIS allows 'Sherrington's Law' to take place. Simply put, stretching a muscle will cause the antagonistic muscle to shut down. With AIS you do not have impingement of the fiber leading to ischemia and lactic acid buildup, leading to irritation and possibly injury.

Al Meo defines the benefits of AIS which are :
"Neuromuscular re-education occurring as the repetitions are done. Every time a new range of motion is achieved, new neural pathways are produced."
"By using repetitions, great amounts of lymph are moved through your body. This is of great benefit in wound and injury healing, as well as detoxification of your body."
"AIS can result in an enhanced immune system, as well as improved feeling of well-being because of increased flexibility."

Make sure to check back next week for the wrap up!

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The Importance of Stretching Pt. 2

Authored by David Brancato

Next to one's repertoire of stretches should be dynamic stretching which occurs by swing motions of the appendages in horizontal, vertical and sagittal angles. This type of stretching should occur before engaging in activities such as martial arts, cycling, skiing, rowing, swimming and the like. The swing motions are very important in martial arts, especially before kumite, katas and/or speed exercises. Swing motions feed warmth and increased blood flow into the legs causing muscle relaxation. Introducing AIS either before or after dynamic stretches affords the hamstrings, quadriceps, and lower back greater flexibility. For those that exercise cardio on spin bikes, elliptical, treadmills or other dynamic cardio machines the principle to adhere to is mild/slow activity for 5 minutes before engaging one's normal intensity on the machine. [www.stretchcoach.com/Brad-Walker]3

The aforementioned information does focus on the exercise enthusiast. But, what about the individual office worker? On the average the gym is visited by more business professionals than professional athletes. The business person comes from an environment where hours are spent in a seated position, leading to physical structural imbalances. The business professional will usually have a hunched, tense upper back, pain in the lumbar/sacral area of the back and neck pain to name a few. Some, but not all of the business professionals have allowed their muscle groups to become weak by being sedentary for long periods of time. These sedentary styles of life cause weak links in the musculature, which in turn leads to pain.

For these office worker individuals it is important to make emphasis to stretch the chest and shoulders. Pinching in the chest and shoulders will lead to back pain. Therefore, the chest needs to be stretched in order to balance the body. Stretching the chest and shoulders will allow the body to relax and go back into alignment.[4]

What about stretching when one is injured? For example, soft tissue injury, sprained ankles, sore shoulder, pulled hamstring to name a few. There is a time and place for stretching and it is not at the time of injury. During a soft tissue injury one should wait at least 72 hours before resuming a stretch. Strength must be attained back into the injured area before resuming any type of stretching. One is to rehabilitate the injured area. Once rehabilitation is attained one will find that the same area has become stronger and more flexible. [www.stretchcoach.com/Brad-Walker]5 However, while Mr. Walker continues with static stretching, it is suggested that AIS would be more beneficial in strength recovery to the injured area of the body.

Specifically, "no you should not stretch an injured muscle if the injury was caused by sudden trauma related blow, hit or fall." But maintaining the range of motion is important and this should be done progressively to get to the pre-injured range of motion." [December 8, 2011 by Roman Paradigm Massage-Therapy]6 "Yes, you should stretch an injured muscle if the injury is from chronic related aches, pain/stiffness in joints, ligaments and muscles. Carefully determining what normal range of motion is for you, and what other muscles may be contributing to this chronic condition need to be assessed." [7]

In Summary:
(1) Stretching is advised because it will make one stronger and increase endurance. [Arnold Nelson, associate professor of kinesiology at Louisiana State Univ in Baton Rouge]. In terms of Mr. Nelson, stretching will benefit those that are unable to lift weights or perform cardio exercises. Nelson believes that, "comparable, but to a lesser scale, activation occurs in the muscle fiber when stretching as with exercise."[8] Reference is made to a study that included 38 individuals divided into 2 groups; with the first group doing stretching for 40 min three times a week primarily stretching the legs; and, the second group without stretching. The stretching included static stretching. Neither group participated in any other exercise. Individuals that stretched increased flexibility. Surprisingly the same group that increased flexibility also increased in strength in performing knee extensions and knee flexion.9.

(2) Dr. Michael Bracko [spokesperson for the ACSM] emphasizes that stretching is complimentary to avoiding injury and keeping flexible.10 Dr. Bracko, who is also the director of the Institute of hockey in Calgary, Alberta says he cannot stop the hockey players from stretching before a game.11.

(3) Dr. Nicholas DiNubile an orthopedic surgeon at Hospital of the University of Pennsylvania in Philadelphia, and author of the book Framework makes emphasis on introducing stretching to exercise programs.

Remembering safety principle number one, there is agreement among all three doctors that one is to never stretch a cold muscle. Rather, performing mild cardio to warm up the muscles is preferable in elongation and flexibility of the muscle fiber.12

Finally for Athletes Power = Strength + Flexibility + Time. If your movement is compromised, injured and/or impaired all exercise and general health will be compromised. To achieve true fitness you need to be able to move freely in all directions without any limitations to your range of motion, as this is what allows you to participate in life's wonderful activities."

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The Core of Motivation

Authored by Bev Hosford

There's nothing better than that "I can do it, I'm excited" feeling. We all want to feel this way about everything we do in life. School, family, work, hobbies, etc. When you naturally love an activity or person, motivation seems to come easier. This is called **intrinsic motivation**. When you inherently enjoy doing something *just because*, that's the most natural form of motivation.

Then, there's the evil twin, **extrinsic motivation**. It's not really so evil, but it's the motivation we crave and search in times of desperation. There are activities we want to do and should do, but just can't muster up the deeper desire for them unless there is an incentive dangling before our face. Rewards include seeing a friend, watching the scale change or getting praise.

Exercise happens to be one of those activities requiring extrinsic motivation. Personal trainers get into a fitness career because they usually have intrinsic motivation for healthy habits. Clients on the other hand, hire help because they're on the other end of the spectrum.

How can we get on the same page?

For the personal trainer, it's first crucial to understand why your client has hired you. If it's for motivation and accountability rather than creativity and safety, then you've got a job cut out for yourself. Keeping them on track can be a challenge when you're the main source of motivation for them. Tap deeper into what their needs are with these two tips. Don't assume that you know what motivates them and don't even assume that they know! Put on your investigative hat and start exploring their thoughts.

#1 Find the Why

Almost every client comes to you with a goal, whether they know it or not and often we take it for face value and move on. They say they want to lose weight, get stronger or get in shape. The personal trainer smiles and moves forward. Stop right there! Ask more questions. Be like the curious child who keeps asking "why?". Some people aren't even quite sure why they want to get fit, they just know it's good for them. That won't support them for the long haul.

They say: "I want to lose weight."
You say: *"Why do you want to lose weight?"*
They say: "I want to fit into my high school skinny jeans."
You say: *«Why do you want to fit into the jeans you wore in high school?»*
They say: "I should be able to get back to that weight."
You say: *"You should? Why is that?"*

Keep the conversation going...

Every time the client responds, ask a follow up question. (unless they seem to be getting annoyed with you) Practice this with a friend or family member to try it out first. The more

you get them to think about the deeper reasoning for staying fit, the more connected they are toward exercise. This will also help you gear their programs and your choice of words to keep them on track.

If a client reveals that they're a better family member when they've gotten a workout, you can ask questions about what meals and activities they're doing with their family on the weekends because you know that's important to them. When they miss a few sessions you can nicely ask if it had an impact on their mood at home and remind them that they mentioned that to you once.

Another client might thrive from competition and progress. You would approach motivating this person differently than the one who exercises for endorphins and family reasons. Exercise isn't one-size-fits-all and neither is motivation.

#2 Make It Social

You're the accountability piece in many people's fitness lives. They know they'll have to fess up to you if they don't behave during the week. That's not always enough. Psychological research demonstrates the power of **social support**. Whether it be a partner who they hike with or a group fitness class they attend - your client will have more success if other people are cheering them along and participating in similar goals.

You could host a monthly walking or hiking group to facilitate this amongst all your clients. Having a time when your clients can be with other like-minded people and invite friends is a win-win for everyone. Your clients have increased commitment to their fitness, you get time off the clock to get to know them all better and the potential to meet new clients if anyone brings their friend.

Not everyone wants their exercise program to be social. This is when you have to go back to their why. Perhaps exercise is their time to get away from other people. This is also important to know. The more we can tap into people's underlying reasons for exercise the better we can help them achieve healthy goals!

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When Can Personal Trainers Give Nutritional Advice?

Authored by Cathleen Kronemer

When I first embarked upon the journey that would ultimately propel me to the competitive bodybuilding stage, there was quite a bit for a newbie like myself to learn about this exciting undertaking. Probably the most crucial piece of advice given to me by my Coach had little to do with dumbbells, repetitions, and numbers of sets. I recall being told that successful bodybuilding required focus and discipline in 2 very different arenas: the gym and the kitchen.

I soon came to discover that this was not an equitable, 50/50 split, either. As it turns out, decisions in the kitchen comprised about 70% of the equation. I am often one to learn things the hard way, unfortunately; thus, it was only through extensive trial and error that I arrived at the realization of just how important proper nutrition and the timing of nutrient intake can be for a successful bodybuilder.

Upon completion of my ACE Health Coaching certification, I was able to offer meal plan guidance to those clients who were seriously dedicated to changing their health through lifestyle modifications. Since that time, a contentious debate seems to have evolved regarding just which professionals are deemed legally qualified to dispense nutritional counseling; and personal trainers have come under a great deal of scrutiny on this very topic.

As it turns out, the laws governing which individuals are working within their legal scope of practice when dispensing nutritional guidance vary from state to state. One case in particular, involving the work of a food blogger in North Carolina, brought this to the forefront of public awareness. The North Carolina Board of Dietetics/Nutrition attempted to send this individual to jail for publicly recounting his personal battle against diabetes and encouraging others to follow his lifestyle.

Chapter 90, Article 25 of the North Carolina General Statutes makes it a misdemeanor to offer nutrition guidance without a license. According to the law, "practicing" nutrition includes "assessing the nutritional needs of individuals and groups" and "providing nutrition counseling." As such, any individual wishing to share his or her insight or personal journey of overcoming serious health issues by adopting a cleaner meal plan cannot legally put the information into public circulation.

When the blogger in question was hospitalized with diabetes in February 2009, he feared suffering the same fate as his grandmother, who eventually died of the disease. To combat this, he embraced the low-carb, high-protein diet known as the "caveman" or "hunter-gatherer" diet. Within 30 days, he claimed to have become insulin-free. Three months later he had lost 45 pounds, which prompted him to start a blog about his success.

However, the North Carolina Dietetics and Nutrition Board decided the blog violated state law, claiming that any nutritional advice provided on the site amounted to "practicing nutrition," for which a license was required. The blogger was told that unless he took down or rewrote his blog he ran the risk of being sued by the Licensing Board. If he lost the lawsuit he could face up to 120 days in jail. The Board's director claimed that while the

author had a First Amendment right to blog about his diet, he was not free to *encourage others to adopt it* unless the state had first certified him as a dietitian or nutritionist.

In 2012, an article appeared in Forbes magazine, describing what seemed like an attempt by the Academy of Nutrition and Dietetics to unfairly limit competition through legislation and other regulatory actions.

The Academy is pushing for strict enforcement of the following Act (known as Illinois SB2936, the "Dietitian Nutritionist Practice Act"):

"Any person who practices, offers to practice, or holds oneself out as being able to provide dietetics and nutrition services without being licensed under this Act shall… pay a civil penalty to the Department [of Financial and Professional Regulation] in an amount not to exceed $10,000."

According to professionals in the field, Registered Dietitians are known as the food and nutrition leaders. Given that there is a significant difference between providing general nutrition guidance, medical nutrition therapy, and general lifestyle/bodybuilding meal plan suggestions, this matter becomes very complicated. In states where licensure has been enacted and enforced, consumers can be secure in the knowledge that any information they receive from such professionals is coming from a qualified individual and not someone with a few weeks of education, or worse, no education at all. The query in our field then becomes one of debating just how much nutritional background/ education a Certified Personal Trainer ought to possess before he/she may be looked upon as knowledgeable, if not "legally" certified by a Dietetics or Nutrition Board.
We as trainers often feel as if we are adrift in a sea of "gray area": if we do not give out at least a modicum of nutritional advice, might we be doing our clients a grave disservice? Yet if we dispense too much knowledge, are we putting our clients at risk? Consider the differences between these 2 statements:

1. "Lean turkey breast is a good source of high quality protein."
2. "You should be eating more lean turkey breast for protein."

The first is a true statement, based upon the generally accepted beliefs and scientific evidence regarding nutritionally dense protein sources. The second, however, tends to be viewed as a nutritional recommendation, which very likely is outside the scope of practice for the majority of personal trainers.

We can best understand and clarify this by realizing that while an individual seeking a personalized exercise plan is best served by contracting the services of a certified trainer, those seeking personalized nutritional plans and counseling are still better off being referred to a registered dietitian. Keep in mind, too, that we can be held accountable if a client's medical condition or physical health deteriorates based upon any nutritional advice we may have dispensed.

Currently, more than 46 states have specific laws in place regarding the certification requirements of those professionals employed in the area of nutritional counseling. Well-respected personal training certifying bodies require that trainers "…refer clients to other

healthcare professionals when nutritional and supplemental advice is requested."
One way of fully servicing a client's needs without risking a breach of professionalism might be to ask him/her to write down the foods most frequently chosen when building meals. From there, you may offer suggestions, alternatives, and even perhaps reasons for these suggestions, without getting into the details of recommended ounces/grams/ servings per day.

If you discover that a client professes to enjoying white bread for sandwiches, it is perfectly acceptable for you to explain how whole-grain breads contain more vitamins, minerals and fiber than most of their bleached flour counterparts, and even perhaps engage in a brief discussion regarding complex carbohydrates versus simple carbohydrates in terms of providing sustained energy. This action differs vastly – and legally – from instructing the client to stop eating white bread altogether and only consume a specific brand of whole-grain bread.

If we stick to what we ourselves currently practice in terms of a healthy nutritive lifestyle, we can be fairly certain that engaging clients in general conversations regarding meal plan ideas is safe. The legal basics to which we should adhere are fairly straightforward:

- Encourage clients to modify their dietary habits to encompass evidence- based healthy eating guidelines.
- Avoid dispensing advice based on fads, trends, or celebrity endorsement.
- Avoid any suggestion of omitting entire food groups, as this may be perceived as encouraging restrictive eating behaviors.
- If asked for a certified nutritional referral, be prepared with names of Registered Dietitians or professional websites (myplate.gov, etc.)

Knowing the scope of practice as fitness professionals, and adhering to the legal parameters outlined by nutritional licensing boards, will ultimately help clients respect personal trainers for their honesty. This goes a long way in forging a strong and healthy client-trainer relationship.

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The Competition Continuum

Authored by Bev Hosford

"Ready, get set, go!"

Does this phrase excite you or make you want to crawl under a rock? Some people love competition. Others run from it (which could be a competition of its own). If you're the competitive type, you may have a hard time understanding the apprehensive exerciser and vice-a-versa.

At the core of every human being is the smallest bit of competition. It's called **self-efficacy**. It's the perception of ones abilities and how successful they feel they are at a given behavior or activity. Self-efficacy can be low, medium or high. It's different than self-esteem, which describes perceptions of self-worth and emotional evaluation.

Low self-efficacy could be present in someone who is lifting weights, using an elliptical or in a seasoned athlete competing at altitude for the first time. It might be hard to imagine that using an elliptical could be intimidating to someone, but it could be!

Self-efficacy changes from one behavior/activity to the next for each individual. This requires us (fit pros) to hone in on the subtle signs and signals.

Recognize self-efficacy

What's this got to do with you? Improving self-efficacy creates a sense of accomplishment and makes an individual more likely to repeat a behavior. As a personal trainer, you can help facilitate this growth.

Believe it or not some people don't exercise simply because they don't feel they could be successful at it.

Walking into a fitness class for the first time or meeting with a personal trainer who is really fit and healthy can be intimidating. Keep this in mind as you get to know your new clients or class participants. Read their body language, they probably won't tell you that they're nervous and some are really good at hiding it.

Questions to ask:

- Have you done this exercise before?
- Do you have any questions or hesitations about it?
- Was this exercise easy or difficult for you?

Competitive athletes have self-efficacy also. Theirs is usually pretty high. Yet, they still experience low self-efficacy when it comes to running on a new course, biking at altitude or facing a successful opponent. Depending on personality style, they too might hide their feelings.

Improve self-efficacy

Understanding the level of self-efficacy someone has about an activity helps sport psychologists, health coaches and personal trainers guide the individual in setting goals and achieving them. Start with each client where they are and help them improve from

there. Be an adaptable guide.

Create challenges small or large that fit into the clients specific goals. The art of personal training is figuring out the sweet spot. What will challenge the client and not too easy for them? With beginners there usually is no challenge too small. If you have a hunch that someone is wary about trying new exercises, keep it simple.

On the other hand, if you recognize the seasoned athlete in someone and high self-efficacy - be ready to push the limits. This doesn't always mean a harder exercise, it sometimes means smarter. Using biomechanical assessments to identify specific weaknesses in their strength can lead you to the missing link in their training regimen. This requires a keen knowledge of anatomy and kinesiology.

Adapt to self-efficacy

Create a continuum of exercises you do with new clients and pay attention to their reaction. Ask them how challenging each one is on a scale of 1-5. For example, you could start with single leg balance and then add some arm or leg movements to it. Take note of how the person does. If they struggle, take a break and make note so that you don't make it harder than that until they're ready.

Another example is starting with a partial squat and advancing to a full squat or holding a plank on the knees before the toes. Always be ready to make an exercise easier or harder. It's the mark of a skilled fitness professional.

When you recognize the person has mastered an exercise, feels confident and reports that it's easy, you can progress to harder exercises. It's like those placement exams. You answer a question and if you get it right, they give you a harder one. If you get it wrong, you get an easier one.

Personal training is indeed quite personal and the more we can tune into the clients behavioral needs, the better we can guide them forward and keep them committed to a healthy lifestyle.

Trainer Tribulations: Apparently Clients Are Not The Only Ones Facing Challenges!

Authored by Cathleen Kronemer

When deciding upon a career path, somewhere between the ages of 17 and 22, we tend to gravitate toward one that reflects not only our knowledge but also our personality. It has been my experience, over the past 27 years in the fitness profession, to observe that personal trainers are a happy bunch. Anyone who chooses to help another individual attain goals, become healthier, and lead a different lifestyle has to be upbeat, encouraging, and positive.

Sometimes, though, outward appearances can be deceiving. In our quiet moments away from the gym, we face challenges like everyone else, but ones which may not be considered by the general public, and even less so by our clients. We may not even be aware of some of these hidden pitfalls of our jobs, yet they most assuredly will impact our work performance. Learning to recognize such obstacles, and developing strategies to overcome them, must become an integral part of our professionalism.

In doing our research we often come across a new twist on an old exercise, or a different mode of training a specific body part. In an effort to impress a client, some trainers are quick to insert such exercises into the client's current workout program. PITFALL: unless you try out the exercise yourself, several times, you are not in an optimal position to describe the movement or to spot appropriately. By adding the move to your current workout, and trying it out at least 2 or 3 times, you can feel more confident as you demonstrate the exercise to your client.

When a trainer is starting out in the personal training arena, building a book of business is always a priority. In order to make the career financially feasible, you need clients…and fast! PITFALL: trying to be the ideal trainer for every potential client who enters the gym. It can be a humbling experience, but realizing your appropriate scope of practice will ultimately make you a better trainer. Rarely does one find a single trainer who is optimally equipped to train a 15-year-old budding gymnast seeking to increase strength and flexibility, a cyclist working on speed and agility, and a power -lifter training for the competitive stage. Somewhere along the line, you will not be able to provide adequate assistance to each and every one of these very diverse individuals. In the name of customer satisfaction, you will leave a more positive image in the client's mind when you refer him/her to a more qualified trainer.

Clients almost always hire a trainer when they have an agenda. Whether their goal is weight loss, increased muscle mass, or a combination of both, they want their results as soon as possible. PITFALL: promising them the results will appear within a fixed amount of time. Is it possible to get a female client "slimmed down" in time to sport that hot little black dress at the high school reunion? Of course it is possible, but is it safe or in her best interests? Perhaps more important to consider is whether such a rapid loss is sustainable. Here the trainer may be faced with a dilemma: do you deliver what the client requests, or do you teach her a new lifestyle that will keep her slim over the course of her life? Your professional reputation is on the line, so consider carefully.
A closely linked corollary to this challenge comes when you, the trainer, seem more motivated than the client when it comes to attaining his/her self-proclaimed goals. PITFALL: pushing too hard. Yes, we must challenge our clients, and gently but firmly encourage them to believe in themselves enough to *want* to change. However, the problem develops when the trainer fails to adequately assess the daily lifestyle his client may face. Regardless of a client's words, his action (or the lack thereof) may stem from limited time, a shortage of financial resources, and the habitual behavior of always putting himself last. If over a period of 6-8 weeks, you fail to see any progress in terms of strength gains, weight loss, or whatever the client hired you to help him change, the frustration that naturally builds up on your part may spill over. Getting angry, losing patience, or wanting the

goal more than the client could lead to the inevitable attrition rate so often seen in fitness centers across the country. While losing a client to circumstances beyond your control, especially before goals have been attained, is quite possibly one of the more frustrating and challenging aspects of the job, it is by no means insurmountable. Learn from it.

New members and potential clients will often choose to hire a trainer who "looks the part," in terms of a stereotype: lean, healthy, muscular, good posture, projects a positive attitude, and always full of energy. The truth of the matter is that trainers are regular people, with regular lives; this means that occasionally you may arrive at work with a lack of energy or a less-than-radiant appearance. Are you allowed to have down days? Of course you are; this is part of being human. PITFALL: viewing your client as your personal psychiatrist, or worse, displaying a clear lack of energy or interest in a client's session. One of the biggest challenges I face in my career, as we all do, is over scheduling. The result is that the smile on your face for the 1:00 pm client has to match the level you are more easily able to offer your 7:00 am client, and some days this seems like a monumental task. While the desire to accommodate a client's schedule, the need to see as many clients as is necessary to meet your financial goals, may be understandable, burnout on a trainer's part may eventually erode at a positive state of mind.

I'll admit to being an avid believer in supplementation --- *for myself*, as recommended by my professional bodybuilding competition coach (who holds a PhD in the sciences, specifically having studied supplementation for the bodybuilder). Most trainers realize by now that these products are largely unregulated by the federal government. Supplements often tend to be marketed to those individuals seeking a quick fix. PITFALL: trying to appease a struggling client by recommending supplementation in the absence of diligent research. This can be a very dangerous practice. Not all of us have the pharmaceutical background to know what supplements might interact with a client's daily medications. If you do happen to possess such knowledge, it is still wiser and safer to refer the client to either a registered dietitian, a pharmacist or his/her physician.

Since fitness is a passion of every trainer, you probably already take your own workouts very seriously. Frequency of performing an exercise leads to familiarity, of course, and you often feel quite confident in demonstrating such exercises to a client. PITFALL: Some clients would truly appreciate understanding what is happening to their body while they're exercising; *explaining* is vastly different from *demonstrating*, and not every trainer feels comfortable with such discourse. Take some time to research the movement, and come up with a way to explain the biomechanics to a client. Teaching science, as it were, may not be your most comfortable arena, but mastering it can become of the most rewarding aspects of the job. The list goes on, but this article provides an overview of the most common obstacle faced by our industry professionals. Each giant step we take to work past these barriers becomes a step toward a higher level of professionalism!

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The Missing Core Muscle

Authored by Bev Hosford

"I want to work my core" is a common goal of many fitness enthusiasts. They're usually referring to their rectus abdominus muscle, which gives the "six-pack" effect (if toned and not covered by fat). Some people have other intentions. They know that having strong core muscles can prevent low back problems and help them perform better in sports.

Regardless of the reason someone wants to work their "core", it's your job as a personal trainer to know all of these muscles and how to strengthen them according to the individuals unique needs. Low back issues don't always stem from a weak core. Sometimes they arise due to strength imbalances.

You can do all the planks you want, but if one side is stronger than the other, it will stay that way until addressed.

Two types of imbalance:

1. Between the same muscle on different sides. The right external oblique might be stronger than the left external oblique.
2. Between two completely different muscles on the same side. The right external oblique, left internal oblique and left latissimus dorsi all work together to facilitate left trunk rotation. If any one of them is weak, the others will work harder.

Latissimus Dorsi - a core muscle?
Yes! Since everyone knows how to strengthen the rectus abdominus using crunches and planks, let's focus on trunk rotation which is a more complex motion. During trunk rotation there are dozens of muscles getting involved to make the motion happen. The strong ones will do most of the work, while the weak ones barely lift a muscle fiber. Ha ha.

Isn't this true on any team? Some do more work than the rest...

How do you ensure better teamwork within your core muscles?
Knowledge of anatomy and body awareness are essential tools for designing more customized exercise programs for each client. This takes time and attention to the details of muscle movement. Since many people know where their rectus abdominus and obliques are, let's examine the less-acknowledged core muscle - latissimus dorsi. Most people think they know where it attaches, but are missing a few pieces.

Attachments: Biciptial groove of humerus bone, inferior border of scapula, last 3-4 ribs (posterior), thoracolumbar fascia (which attaches into the spinous processes of the lumbar vertebrae), superior/posterior iliac crest.

Feeling lost in the words? You can pull out an anatomy book for reference. Explore on the bony landmarks a partner (with their permission of course) and locate the muscle tendons on them.

Why is lat a core muscle?
The attachment into the iliac crest is one of the main reasons the lat likes to help with trunk rotation and lateral side bend! It also helps extend your trunk. Avoid memorizing muscle motions. When you know the attachments you can always figure out the function of the muscle. "Think like a muscle" is what Andy always says. Then, you can point it out to a client and ask them if they feel it participating in their exercises on both side equally.

This leads to better cueing and form.
It would be impossible for most people to feel every muscle that participates in trunk rotation, so choosing one muscle like the lat or external oblique to focus on for a set of repetitions is a great way to make it simple, get better focus from the client and exercise more effectively.

How to Set Your Sights on Training Visually Impaired Clients

Authored by Cathleen Kronemer

As a personal trainer at a large community center, I am fortunate to be able to work with a variety of professionals, each of whom is certified and has somewhat of a "specialty favorite" client he or she prefers to train. One of these is a former Golden Gloves champion who likes to, literally, throw punches into a client's workout routine. We have Body Alignment specialists, those who enjoy preparing athletes for marathons or sprint events, and even trainers who are gifted enough to work with our population of mentally challenged young people.

There is no doubt in my mind, however, that the majority of trainers across the country find themselves working with those whom we might classify as the "typical" fitness clients. Many of these are young moms, retired seniors, or athletic men and women wanting to become a bit more buff before Spring Break at the beach. While every client is indeed unique, and deserves our most attentive creativity when designing a program to foster his/her goals, rarely are we presented with an opportunity to truly think outside the box, and change an individual's life. Trainers encourage clients to challenge their abilities every day, so why are many of us hesitant to challenge ourselves?

I have had the opportunity over the last 2 years to train a woman in her 50's who is visually impaired. Laura was not born sightless; over a period of several years, her eyes' rods and cones slowly ceased to function. Today, while unable to drive, she has enough sight to observe shadows, and can read with a super magnifier attachment to her computer. When Laura's regular trainer left the gym, I was the one she requested to take over her personal training regimen.

At first I was understandably hesitant, not knowing quite what to expect in terms of this client's capabilities or willingness to be challenged. As it turned out, I not only gained a good friend but also a tremendous insight into the depth of Laura's rich, fulfilling and exciting life.

Taking the time to learn about a client's condition is always a prudent investment of a trainer's energies. Keeping in mind that the body of a client living with visual impairments is typically no different than yours or mine, his exercise needs too will be similar. A comprehensive workout program, one that addresses both fitness and nutritional guidance, helps prevent obesity, improves overall health and leaves the client with a sense of empowerment, according to the National Center on Physical Activity and Disability, or NCPAD. Unless told otherwise, by either the client or his doctor, a visually impaired person can engage in many formats of exercise as long as appropriate accommodations are available.

Once you have assessed the individual needs of the client, as well as noting his current lifestyle and overall goals, you can proceed with the fun and challenging job of designing an outside-the-box program. *American Fitness* points out that an individual who is totally blind cannot relate to visual descriptions; therefore, he must be taught exercise activities differently from a client who has some visual ability. With the client's permission, the trainer may have to use touch to demonstrate a movement. A second challenge is to ensure

the safety and efficacy of the training environment. As opposed to running outdoors with a partner, a visually impaired client may prefer instead to become familiar with the parameters of an indoor track, thus enabling him to adapt to his aerobic exercise without a guide.

If building strength and increasing muscle tone is a goal of the client's, the trainer has many options. One of the safest and most comfortable ways to strength-train is by creating a circuit of stationary machines. Depending upon the level of impairment, free weights and other techniques may be an option. Dumbbells, kettle bells, resistance bands and body balls can all be creatively and effectively woven into a program for a visually impaired individual, as long as the trainer "demonstrates" a movement by guiding the client's arm position for the first few repetitions. Verbal cues also become an important tool in training these clients. Think carefully about the best ways to describe the execution of particular movements. Once that neural pathway has been created, the movement becomes relatively intuitive, especially with repetition.

It has been my experience that balance and flexibility are concerns to be addressed in a complete exercise program. I often have my client Laura perform body weight squats, side lunges with the outstretched leg briefly lifted, and push-up's. In an effort to develop a sense of self-efficacy in the realm of spatial awareness, balancing on one foot or performing walking high knee raises across the room can increase body awareness and movement in space.

A secondary condition that often presents itself in visually challenged clients is poor posture. When trying to design appropriate strength exercises, keep in mind that a client who is able to read printed material with the help of a magnifier is often prone to stooping over. Cable crossovers or rows, to open up the chest muscles and strengthen back muscles, can easily be hands-on demonstrated and effectively performed.

Many persons with limited sight capabilities, most notably those who have been blind since birth, get little or no exercise, according to a recent study from the Centers for Disease Control and Prevention (CDC). Here is a sobering statistic (which we as trainers have the power to change, by the way!): only about 50 percent of adults with visual impairment are physically active. Of that group, 50 percent were more likely to report at least one chronic health condition than challenged adults who do participate in physical activity. Chronic/comorbid health conditions often include diabetes, heart disease and risk of stroke. Interestingly, 82 percent of visually compromised adults were more likely to be physically active if the suggestion or urging comes from a medical professional. A big hurdle for many is simply securing a means of transportation to and from the gym. In addition, there is often trepidation surrounding the fear of injury, which goes hand in hand with a lack of available information regarding helpful exercise resources. This is precisely how a trainer who is well versed in the dynamics of working with a blind client becomes a highly valued commodity.

In today's society, visual impairment frequently places such individuals at a social disadvantage; to those with healthy vision, blindness comes with presumptions of helplessness and incompetence. This no longer has to be a universal fact. Any individual who gets in shape will look better and feel better. This leads to increased confidence, self-

esteem and empowerment. Consider how important these aspects can be for any of your clients; now think about the magnitude of this dynamic for an individual who is blind. The ultimate goal of inclusiveness is to help a new participant feel safe and welcome enough to return, so that he is fully able to reap the benefits of a sustained exercise program.

As for my client, Laura? I truly believe that although she is the one who is significantly limited in her visual ability, we both have been given the gift of seeing life more clearly!

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Stability Training Muscles

Authored by Bev Hosford

What do you think of when you hear the word stability? It's a buzz word in fitness and used often. There are many interpretations, but generally when people say "stability" they mean strength. They sometimes mean the "smaller" muscles in the body.

Stability is having four legs under your chair instead of three. It's the cement foundation of a house. In the human body the feet seem to have the best analogy, yet it can refer to having strength in any muscle, large or small. The truth is that all muscles need stability.
Since people come to personal trainers looking for more stability, it's good to clarify what they mean by it. It's also helpful if you're clear on what stability means to you and how you help people gain this specific type of strength. In the end we all have the same goal in mind - physical fitness.

Meet stability's evil twin.
The shoulder is a common area that people seek stability in, because the gleno-humeral (GH) joint (where the arm bone meets shoulder socket) has the most mobility in the body. Mobility seems to be stability's evil twin. They have an inverse relationship, making it tough to have both at the same time. Many textbooks point out that a joint is either mobile or stable, but not both.

Can you have it all?
Sure! The gleno-humeral (GH) joint has a wonderful neighbor called the scapulo-thoracic (ST) joint. This is where the scapula (shoulder blade) attaches to the thorax (ribs). If this joint is strong (stable) it helps anchor the GH-joint more effectively. And you can guess what happens if it's not...lack of stability through the entire shoulder is the result, because it's all connected.

Strength comes from muscles and there are many at play in the shoulder region. Let's focus on one that you know and strengthen your awareness around it's attachment points and function. The rhomboids have become fairly popular in their role to anchor the scapula to the spine. When you take a closer look, you'll see the possibilities of this muscle.

Know thy muscle attachments on each individual.
It breaks down into two parts, the rhomboid minor and rhomboid major, but the attachments are as follows: Spinous processes of cervical vertebrae 7 (C7), spinous processes of thoracic vertebrae 1-5 (T1-T5) and the medial border of the scapula.

Now, find a willing partner and locate these points on them. Ask them to contract the muscle on the right side and then the left side to see what they feel. Is it an even amount of contraction happening? Is the scapula moving the same way on both sides from your point of view?

There's more to it than what's memorized.
Most people know this muscle retracts the scapula (brings it closer to the spine), but it can also elevate the scapula (bringing it closer to the skull. Sometimes, when you're cueing a client to use this muscle it could do more harm than good...

Depending on the distance from a person's C7 vertebrae and the top of their scapula it can land up working against the goal of better posture. If too much scapular elevation occurs, other muscles like upper trapezius and levator scapula will want to help out, which can cause tension in the neck region.

The distance between C7 and the top of the medial border of the scapula are what dictate how much elevation occurs during retraction. Check it out on 5-10 different people and you'll see the variations.

Muscles like latissimus dorsi, serratus anterior and lower trapezius oppose scapular elevation, so grab your anatomy book and brush up on those too!

Knowing the muscle attachments, finding them on a client and understanding what happens when the muscle contracts on that individual can make or break what you're trying to achieve whether training for stability, strength or some other catchy industry word.

Training a Client on Blood Thinners: Anticoagulants Don't Always Indicate Anti-Exercise

Authored by Cathleen Kronemer

As Personal Trainers, we are well versed in the subtleties of tweaking clients' workouts to accommodate a variety of chronic health issues. I work with many such individuals on a regular basis: clients who are hearing-impaired, visually challenged, suffer from Multiple Sclerosis, and a former golfer/ avid motorcyclist who has had to re-learn *everything physical* after a biking accident left him with Central Cord Syndrome. I cherish the opportunity to learn about these challenges, and to observe the positive changes that accompany hard work and dedication on the part of the clients.

While these are fairly pronounced health situations, some are not as readily observable; as such, it is incumbent upon us to ascertain any potential pitfalls during an initial client assessment. One situation, which usually remains masked and silent until it presents itself quite dangerously, is the mysterious case of blood clots and pulmonary embolisms. Unless a client reveals that he is on blood thinners, it often does not occur to us to ask, and what a judgmental error that may turn out to be.

Anticoagulants are a class of pharmaceutical drugs that help prevent blood clots. They are sometimes prescribed for individuals believed to be at a higher risk of developing clots, or to reduce their chances of suffering strokes and/or heart attacks.

A clot is little more than a seal created by the blood to ease the bleeding that results from wounds. While we count on them to stem the tide when we incur a cut or a more serious injury, blood clots can also block blood vessels and impede or stop the flow of blood to vital organs such as the brain, heart or lungs if they should develop in the wrong place. Often referred to as blood thinners, anticoagulant medications work by interrupting the process of blood clot formation.

Patients for whom such drugs are prescribed generally take them on a daily basis. They can certainly be life affirming and lifesaving; however, this course of treatment does place the user at an increased risk of heavily bleeding from what others may consider to be an incident requiring minor first aid. Given the injury potential of many sports, it is of critical importance that we are not only aware of a client's health history, but also able to plan careful yet effective workout programs for such an individual.

Falls or injuries that occur during vigorous exercise can cause serious internal bleeding for a client who regularly takes a blood thinner. Blows to the head or body can potentially proceed in a dangerous direction. Symptoms of internal bleeding include dizziness, weakness, unusual bruising, bleeding from the nose and gums, or black stool, according to the *Agency for Healthcare Research and Quality*. Understanding the potential health risks that could accompany such symptoms, Personal Trainers may wish to exercise caution and steer such clients away from contact sports such as wrestling, boxing, football and hockey. Resistance-training under a watchful eye is considered safe, as are swimming, walking and jogging.

Another important consideration is determining the reason a client has been prescribed an anticoagulant medication. This can run the gamut from preventing strokes/heart attacks/ blood clots to having had a history of deep vein thrombosis (blood clots that form in the large veins of the limbs), pulmonary embolus (a clot that travels to/develops within the lungs), atrial fibrillation (irregular heartbeat) or after having received an artificial heart valve. In such cases, a cardiologist may have recommended that his client remain active enough to cultivate or maintain a healthy cardiovascular system. Options for effective exercise do indeed exist, such as swapping rides on a rough-terrain mountain bike for a stationary cycle or a Spin class. If the client has been given medical clearance to cycle outdoors, a helmet is a must, whether or not he resides in a state requiring the use of protective headgear.

While we may typically see such situations with our elderly and non-athletic population, these same risks have also been observed in younger, healthy and athletic individuals. The lifestyle of an athlete might seem to paint "the picture of health"; yet several mechanisms do exist that could potentially place an athlete at "higher risk" for development of a clot:

- A disparity between the two systems that balance the clotting process ~ either excessive activity of the proteins and blood platelets that form clots (the procoagulant system), or a dearth of activity within the system that dissolves blood clots as they form (the fibrinolytic system);
- Trauma to the blood vessel wall, which may occur after a bone fracture, not uncommon in athletes;
- Dehydration, which renders the blood "thicker" than usual.

Unfortunately, there are few studies currently underway that are investigating the influence of physical training on blood clot formation and dissolution. It is taken as fact, for example, that blood levels of the clotting protein "*factor VIII*" increase with exercise and persist during recovery. Theoretically, while this could lead to an increased risk of blood clots in athletes, data also indicate that the fibrinolytic system dissolving any potential blood clots is also overactive in avid exercisers. With such over-activity, the athlete may be protected from developing clots. The net effect of these changes remains in dispute, pending further research and study.

During a typical hour-long session with a client, the trainer may observe signs that the exercises being performed are hitting the mark. Sometimes, though, a client will begin to complain about some aspects of discomfort (being tired, muscles feeling sore, etc.) While this is fairly common, especially for a dedicated, hard-working client, it is worth noting that the following can also be warning signs of a deep-vein thrombosis or pulmonary embolism:

- Swelling, usually in the leg (can also occur in the arm, especially in weight-lifters, gymnasts, rowers, etc.)
- Leg (or arm) pain or tenderness, usually described as a cramp
- Reddish or bluish skin discoloration
- Leg warm to the touch
- Sudden shortness of breath
- Stabbing chest pain that may worsen with deep breaths
- Rapid heart rate
- Fainting
- Unexplained cough, sometimes accompanied by bloody mucus

We must remain vigilant to these cues, especially in clients whom we know are currently on a regimen of daily anticoagulant medication. Armed with knowledge, we can feel reassured in assisting such individuals and helping them lead a healthy, confident life.

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Train Hard, Play Hard, Refuel Intelligently

Authored by Cathleen Kronemer

"What should I eat post-workout?"

I receive this question quite often during my daily client training. A considerable amount of advertising money seems to be devoted to on-the-go sports drinks, shakes and protein bars these days, and it is little wonder that clients become overwhelmed in the miasma of the decision-making process.

Being familiar with many of my clients' personal lives and schedules, I try to answer in the simplest manner possible. If a client is a recreational exerciser who trains two or three times a week, for 30 to 60 minutes, chances are his body does not become depleted during fitness workouts. In addition, there is ample time to refuel between trips to the gym. However, many trainers work with competitive swimmers who will be participating in multiple events in the same day. Triathlete clients, who engage in two-a-day workouts, or soccer players working towards a weekend-long tournament, typically meet with a personal trainer more often as their big day approaches. For these athletes, who need to rapidly recover from one intense exercise performance bout in preparation for the next one, the recovery diet deserves to be in as excellent shape as their bodies.

Planning a recovery diet, and having the right foods and fluids readily available, is the key to being able to easily and adequately replace calories, carbohydrates, protein, fluids and sodium lost during serious training. With this in place, along with correct planning of the workload and the recovery time, the marvels of adaptation allow the body to become fitter, stronger and faster over time. A proactive recovery means providing the body with all the nutrients it needs, in a speedy and practical manner, to optimize the desired processes following each session. If the important elements of a recovery meal are readily available, the body is more inclined to utilize them in an efficient manner. By providing these nutrients, an athlete can signal his body that post-exercise is the perfect time to rebuild.

We improve recovery nutrition availability in two ways:

- Increased blood flow to skeletal muscle during and after exercise means that more nutrients are floating around more quickly.
- Providing an amino acid and glucose dense blood supply during and after exercise means that the rate of protein synthesis increases.

Post-exercise nutrition has evolved into a science; yet there is by no means a one-size-fits-all solution. The optimal amount of macronutrients, as well as the ratio of these nutrients, can vary greatly for each athlete. Whether you are armed with a degree in competitive sports nutrition, or have done a tremendous amount of research on the topic, your recommendations may want to be based upon the client's age, gender, body size, physical condition, duration and type of events in which he will be participating, and environmental factors such as temperature and altitude (very important considerations for outdoor athletes). In addition to these parameters, consider the following:

- How much fuel was utilized during training?
- What was the approximate extent of muscle damage and sweat loss incurred while exercising?
- Was a stimulus presented to increase utilization of muscle protein?

An easy way for clients to fully realize what is happening at a cellular level during recovery is by encouraging them to think in terms of the 3 R's:

- Refuel
- Rebuild
- Rehydrate

Each of these critical recovery concepts calls for a different combination of fluids, electrolytes, carbohydrates, and protein—each playing a specific role in the process. Although not a cookie-cutter determination, a few general guidelines for clients of this caliber might be:

- **15-60 minutes** The amount of time following training or competition during which he should commence his recovery nutrition routine
- **2:1** The minimal carbohydrate to protein ratio desirable to consume after activity, in order to jump-start recovery. Depending upon the nature of the activity, its intensity and its duration, I have seen references that support ingesting anywhere from a 2:1 to 4:1 ratio. Experimentation over time will end up dictating what works best for each client.

Recovery encompasses a complex range of processes, aside from simple muscular adaptation:

- Refuels the muscle and liver glycogen stores
- Replaces the fluid and electrolytes lost via sweat
- Manufactures new muscle protein, red blood cells and other cellular components as part of the repair and adaptation process
- Allows the immune system to handle the damage and challenges brought about by the training session or participation in the competitive event.

Muscle glycogen is the main fuel utilized by the body during moderate and high intensity exercise. Inability to adequately replace glycogen stores through carbohydrate consumption will lead to compromised performance in subsequent sessions. Therefore, the major dietary consideration when planning post-exercise refueling is the amount of carbohydrate ingested. Depending upon the fuel cost of the training schedule, or the need to fuel in the time leading up to race, a serious athlete may need to consume a slight excess of carbohydrates per kg body weight each day to ensure adequate glycogen stores. The type and form of carbohydrate that is most suitable will depend upon a number of factors:

- The athlete's overall daily carbohydrate and energy requirements
- Gastric tolerance, access and availability of suitable food options
- The length of time before the next training session

In general, within the immediate post- exercise period (ideally the first hour), athletes are encouraged to consume a carbohydrate -rich snack or meal that provides at least 1-1.2 g of carbohydrate per kg body weight. During this time frame, the rate of glycogen synthesis is greatest. The importance of this becomes highlighted when the time between prolonged training sessions or performance events is less than 8 hours.

Another inquiry I often receive from clients is the best choice of carbohydrates to facilitate his goals. Research has demonstrated that the following whole foods (not supplements) tend to produce optimal results:

- Sweet potatoes
- Oats
- Wild rice
- Bananas
- Chickpeas

Consuming some protein along with the carbs stimulates faster glycogen replacement. The protein optimizes muscular growth, since it is the nutrient that drives the body to repair damaged muscle tissue. Protein is also desirable in the recovery time following training sessions or competitive events, as it will facilitate the synthesis of muscle protein, a key process for building muscle. Consuming protein along with carbohydrates during recovery from endurance exercise appears to afford the body its best chances for recovery. As the glycogen is being replaced with the carbs, the lean protein source provides the body with amino acids (building blocks of protein) on signaling pathways that control muscle protein synthesis. I like to utilize the metaphor of a shuttle system when I explain this to clients. The protein gets shuttled into the bloodstream to do its important work, with the carbohydrates serving as the rocket.

The amount of protein required for the post-workout period is often overestimated, again as a result of media hype from supplement providers. More protein in a recovery nutrition meal does not always equal increased muscle building. The average body is unable to digest, and therefore not able to utilize, much more than 20-40 grams of high quality lean protein at any given time. Excess consumption, sadly, often gets stored in the body as adipose tissue. In addition, it is important to switch up protein choices on a regular basis, in order to reduce the chances of developing of any potential food intolerance/allergy.

During the recovery phase, the athlete's body experiences a reduction in catabolic (breakdown) processes and a gradual increase in anabolic (building) processes, which continues for at least 24 hours after exercise. Recent research has shown that early intake of essential amino acids from good quality protein helps to promote the increase in lean muscle mass rebuilding. Ongoing studies are still addressing the optimal type of protein (casein, whey, or vegan sources such as pea and hemp) to ingest during this window of opportunity. To a large extent, this choice depends upon an individual's tolerance, allergies, and scheduling for the remainder of the day. Consuming complete sources of protein in meals and snacks after this time frame *will* promote further protein synthesis, although not at the same voracious rate as is exhibited during that first critical hour.
The most recent evidence points to carbohydrates as one of the most promising nutritional immune protectors. Ensuring adequate carbohydrate stores before exercise, and

consuming carbohydrate during and/or after a prolonged or high-intensity workout, have both been shown to reduce the disturbance to immune system markers in the body. The carbohydrate seems to reduce the stress hormone's response to exercise, thus minimizing its effect on the immune system, as well as supplying glucose to fuel the activity of the myriad of white cells within the immune system.

If your client indicates that he has trouble tolerating solid food after vigorous training, he may have to resort to experimenting with liquid recovery foods. A surprisingly easy and convenient choice is chocolate milk, which has often been suggested as an ideal option during recovery since it very simply combines carbohydrates and protein. The *International Journal of Sport Nutrition and Exercise Metabolism* reported that athletes who drank chocolate milk after an intense bout of exercise were able to work out longer and with more power during a second workout as compared to athletes who consumed commercially prepared sports drinks.

"Our study indicates that chocolate milk is a strong alternative to other commercial sports drinks in helping athletes recover from strenuous, energy-depleting exercise," says Joel M. Stager, Ph.D., Professor of Kinesiology at Indiana University. "Chocolate milk contains an optimal carbohydrate to protein ratio, which is critical for helping refuel tired muscles after strenuous exercise and can enable athletes to exercise at a high intensity during subsequent workouts."
Another recent study, this one published in the *Journal of the International Society of Sports Nutrition*, concluded that cereal and non-fat milk is as good as a commercially-available sports drink in initiating post-exercise muscle recovery.

While this does in fact seem like an ideal solution to the quick and easy recovery meal conundrum, there is an interesting point to consider on the topic of chocolate milk: Intense exercise tends to create an acidic environment throughout the body. Animal protein (as is found in dairy products) is acid forming. If the acid is not properly neutralized during the refueling meal, the body may compensate by pulling the necessary calcium from skeletal bones and nitrogen from muscle tissue. Greens, sprouted vegetables, and certain fruits will have a neutralizing effect on the body, and make great food options to enjoy along with the chocolate milk.

Greek yogurt has double the amount of protein than that found in most regular yogurts, and is a great source of carbohydrates. "Mix it with cereal or fruit," recommends Dr. Louise Burke, Head of Sports Nutrition at the Australian Institute of Sport and coauthor of *The Complete Guide to Food for Sports Performance: Peak Nutrition for Your Sport*. Fresh berries pack micronutrients that have been proven to help fight muscle soreness. Pineapple is also known to have anti-inflammatory properties to further aid in muscle recovery. Kiwis help facilitate digestion and provide necessary dietary fiber. Try experimenting with fruit that offers anti-oxidants as well as a neutralizing effect, and stir into a cup of yogurt.

The benefits of post-exercise nutrition, regardless of gender, include:
- Improved recovery
- Less muscle soreness
- Increased ability to build muscle
- Improved immune function

- Improved bone mass
- Improved ability to utilize body fat

Repair and rebuilding occurs through the breakdown of old, damaged proteins and the construction of new ones — a process known collectively as protein turnover. Muscle protein synthesis is increased slightly (or remains unchanged) after resistance workouts, while protein breakdown increases dramatically. During this time frame, it seems that the body is doing much more breaking-down than building-up. The relationship between these two parameters represents the metabolic basis for muscle growth. Muscle hypertrophy occurs when a positive protein balance can be established during recovery — in other words, when we make sure we have enough raw materials available for protein synthesis to occur, so that it doesn't lag behind protein breakdown. Studies show that this trend can be reversed. Specifically, protein synthesis may actually be stimulated and protein breakdown suppressed when the right type of nutrients are consumed after exercise.

With so many positive reasons to pay close attention to the post-exercise meal, you will be providing a valuable service to your clients by being able to answer their questions about timely and high-quality recovery nutrition.

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About The Authors

Bev Hosford is a fitness entrepreneur who believes that fitness, wellness, emotional health and satisfaction with life are all intertwined. Bev has her master's degree in exercise psychology, is a certified personal trainer, health coach and muscle activation techniques specialist. She teaches and coaches fitness professionals around the world from her laptop in Montana.

Cathleen Kronemer is an AFAA-Certified Group Exercise Instructor, NSCA-Certified Personal Trainer, competitive bodybuilder and freelance writer. She is employed at the Jewish Community Center in St. Louis, MO. Cathleen has been involved in the fitness industry for 22 years. Look for her on www.WorldPhysique.com.

David Brancato PhD, ND, CPT. Dr. Brancato's cumulative experience in nutrition, alternative medicine, chemistry, toxicology and physiology directed him to holistic approaches in human physiology to correct system imbalances. He maintains his professional certifications as a Naturopath from the American Naturopathic Medical Certification and Accreditation Board; the National Federation of Professional Trainers; Black belts in Kick Boxing and Kenpo.

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TEST ANSWER SHEET B
Form No. 19641

NCS Pearson™

Self-Test: June 2016

1. Higher intensity workouts can do which of the following to appetite?
   a) Increase appetite
   b) Decrease appetite
   c) No effect on appetite
   d Both increase and decrease appetite depending on the number of reps per set

2. Exercising at what intensity of your HRmax maximizes the amount of fat burned during a workout?
   a) 100%
   b) 80-95%
   c) 65-80%
   d) 50-65%

3. Which of the five stages of change do the cons outweigh the pros so they are not likely to make any changes to their lifestyle?
   a) Pre-contemplation
   b) Contemplation
   c) Preparation
   d) Action

4. Even after getting to the action stage, what percentage of clients dropout during the first six months?
   a) 25%
   b) 50%
   c) 75%
   d) 0%

5. Which of the following is a symptom of deficiencies that runners experience?
   a) Reduction in performance energy and a perception of increased effort being spent during training
   b) Taking longer to recover between runs
   c) Becoming prone to infections and injury and injuries taking longer to heal
   d) All of the above

6. Which of the following is a common deficiency seen in runners?
   a) Iron and magnesium
   b) Vitamins D and B12
   c) Zinc
   d) All of the above

7. The lack of foods rich in EFA's in a runner's diet can cause what?
   a) Depression
   b) Loss of memory
   c) Both a and b
   d) Neither a nor b

8. The rotator cuff is a group of *how many* muscles that all attach from the superior (upper) humerus to the scapula bone in different places?
   a) 2
   b) 3
   c) 4
   d) 5

9. There is one internal rotator and three external rotators, what is the name of the one internal rotator?
a) Subscapularis
b) Infrapspinatus
c) Teres Minor
d) Supraspinatus

10. What is a common mistake with rotator cuff exercises?
a) Too much motion
b) Too much resistance
c) Moving too fast
d) All of the above

11. Energy comes from ATP, where is ATP manufactured?
a) Mitochondria
b) Nucleus
c) Ribosomes
d) DNA

12. What is a foreign chemical substance found within an organism that is not normally naturally produced by or expected to be present within that organism called?
a) Antibiotic
b) Xenobiotic
c) Probiotic
d) Biotic

13. Which of the six physiological stages that cascade with one another leading to disease occurs when a toxin first causes stimulation then depression?
a) Spreading phenomenon
b) Adaptation
c) Bipolarity
d) Switch phenomenon

14. What is known as the "feel-good" chemical?
a) Dopamine
b) Serotonin
c) Oxytocin
d) Endorphin

15. Health is the state of complete _____ well-being and not merely the absence of disease or infirmity.
a) Physical
b) Mental
c) Social
d) All of the above

16. Exercise may alter brain chemistry in much the same way that antidepressants do by regulating what neurotransmitter?
a) Serotonin
b) Norepinephrine
c) Both a and b
d) Neither a nor b

17. Which of the following is not an effective detox program?
  a) Fasting
  b) Colonic cleansing
  c) Ionic foot baths
  d) All of these are ineffective detox programs

18. All alternative health practitioners will agree that detoxification has to?
  a) Simultaneously occur in the bowel, liver, and, and blood
  b) Occur in the bowel, liver, and blood in easiest order
  c) Occur first in the bowel, next in the liver, and last in the blood
  d) Occur first in the blood, next in the liver, and last in the bowel

19. Which of the following is true about stretching?
  a) The athlete will attain better
  b) Stretching is necessary before warming up with light aerobic exercise
  c) Stretching before exercise will relax the muscle fibers
  d) Stretching after exercise will assist in lengthening the range of movement

20. Which of the following is NOT a benefit of Active Isolated Stretching (AIS)?
  a) Neuromuscular re-education occurs as the repetitions are done
  b) Wound and injury healing, as well as detoxification of your body
  c) Enhanced immune system
  d) All of the above are benefits of AIS

21. Dynamic stretching occurs by swing motions in which angle?
  a) Horizontal
  b) Vertical
  c) Sagittal
  d) All of the above

22. In regards to injury, which of the following is true of stretching?
  a) If an injury was caused by a sudden trauma, you should stretch it immediately
  b) If an injury is from chronic related aches, pain/stiffness in joints, ligaments, and muscles, do not stretch it
  c) During a soft tissue injury, you should wait at least 72 hours before resuming a stretch
  d) None of the above are true

23. Which is true of intrinsic and extrinsic motivation?
  a) Extrinsic motivation occurs when you naturally love and activity or person
  b) Intrinsic motivation requires an incentive
  c) Extrinsic motivation is needed when you just can't muster up a deeper desire
  d) Intrinsic motivation is more closely aligned with exercise

24. Bodybuilding requires focus in the gym and the kitchen. The kitchen comprises what percentage of the equation?
  a) 50%
  b) 60%
  c) 70%
  d) 80%

25. As a trainer, which of the following would be inappropriate to do, in regards to nutritional advice?
a) Encourage clients to modify their dietary habits to encompass evidence-based healthy eating
b) Dispense advice on fads, trends or celebrity endorsement
c) Avoid any suggestion of omitting entire food groups
d) Recommend registered dieticians or professional websites

26. What is the perception of one's abilities and how successful they feel they are at a given behavior or activity?
a) Self-efficacy
b) Self-esteem
c) Self-worth
d) Self-confidence

27. Which of the following was NOT referred to as a PITFALL?
a) Having a client do an exercise you haven't tried at least two or three times
b) Having an off day
c) Pushing too hard
d) Recommending supplements without adequate research

28. Which of the following is an example of a muscle imbalance?
a) The right external oblique is stronger than the left external oblique
b) The right external oblique is stronger than the left latissimus dorsi
c) Both a and b
d) Neither a nor b

29. Which of the following is NOT a core muscle?
a) Rectus abdominus
b) Obliques
c) Latissimus dorsi
d) All of the above are core muscles

30. What percentage of adults with visual impairment are physically active?
a) 25%
b) 50%
c) 75%
d) 100%

31. What is referred to as stability's evil twin?
a) Mobility
b) Flexibility
c) Functionality
d) Strength

32. What joint has the most mobility in the body?
a) Gleno-humeral
b) Scapulo-thoracic joint
c) Synovial hinge joint
d) All have similar mobility

33. Which of the following is a symptom of internal bleeding?
a) Dizziness
b) Weakness
c) Black stool
d) All of the above

34. Which of the following could potentially place an athlete at risk for developing a blood clot?
a) A disparity between the systems that balance the clotting process
b) Trauma to the blood vessel wall
c) Dehydration
d) All of the above

35. Which of the following is NOT a warning sign of deep vein thrombosis or pulmonary embolism?
a) Reddish or bluish skin discoloration
b) Sudden shortness of breath
c) Slowed heart rate
d) Unexplained cough

36. How do we improve nutrition availability?
a) Increased blood flow to skeletal muscle during and after exercise means that more nutrients are floating around more quickly
b) Providing an amino acid and glucose dense blood supply during and after exercise means that the rate of protein synthesis increases
c) Both a and b
d) Neither a nor b

37. The type and form of carbohydrate that is most suitable will depend upon?
a) The athlete's overall daily carbohydrate and energy requirements
b) Gastric tolerance, access and availability of suitable food options
c) The length of time before the next training session
d) All of the above

38. What is the minimal carbohydrate to protein ratio desirable to consume after activity, in order to jump-start recovery?
a) 1:1
b) 1:2
c) 2:1
d) Carbohydrates are not necessary after activity, just focus on protein

39. How much protein is the average body able to digest and utilize at any given time?
a) Unlimited
b) 1 gram per pound of bodyweight
c) 40-80 gram
d) 20-40 grams

40. Which of the following is NOT a benefit of post-exercise nutrition?
a) Improved immune function
b) Improved bone mass
c) Increased muscle soreness
d) Increased ability to utilize body fat

National Federation of
PROFESSIONAL TRAINERS
P.O. Box 4579
Lafayette, IN 47903