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[1]IBISWorld, Personal Trainers in the U.S. - Industry Market Research Report, Feb. 2015 [2]Results of study conducted by MarketLab, a third-party researcher, in May-June 2016, sampling U.S.-based Club Managers
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WINTER 2017

VOLUME THIRTY-FIVE // NUMBER ONE

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RESTORATIVE MOVEMENT

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LAURIE McCARTNEY, PRESIDENT

TAKE FIVE

SOME OF OUR FAVORITE HIGHLIGHTS FROM THIS ISSUE:

NEW YEAR AND NEW POSSIBILITIES

Welcome to 2017!

Each new year brings exceptional opportunities and possibilities for positive change and growth. As the new President of Global Fitness & Wellness Solutions, I'm incredibly honored and excited to be a part of the evolution of our industry and our organizations, which include AFAA (a group fitness brand leader worldwide for more than three decades), NASM (a leader in the field of personal training certification and advanced specializations), and Premier Global (one of the leading personal training education providers in the United Kingdom).

I know that, as a fitness professional, you're committed to inspiring momentum and progress in your clients. When you see results, when you watch your clients find something in themselves, when you begin to see this person standing in front of you transforming and taking on challenges they never imagined—that's when you realize that the investment you've made in that client (and yourself) is paying off. You know you're paying it forward. You're helping people get a stronghold on their health, their wellness and their future.

That is exactly what we want to provide this year for *our* clients—our inspiration. And that person is *you.* In 2017 we are planning to bring you new educational opportunities, resources, services and partnerships to elevate your career and your clients' outcomes. You'll see some of these new products and partners highlighted throughout the pages of this issue of *American Fitness*: Partners like prAna, Insure Fitness Professionals and Yes! Fitness Music, plus updated and recharged courses like the NASM Corrective Exercise Specialization and the new AFAA Sustaining Mobility and Movement Series.

Whether your clients are training for a physically (and mentally) challenging event like a triathlon or are determined to counteract the negative effects of a sedentary workday, articles such as "Double-Check Your Triathlon Training Knowledge" and "Lower Crossed Syndrome" can help you bring their goals within reach. We'll offer tips on how to modify workouts like a pro (p. 16), as a resource for new and aspiring instructors, *and* as a refresher for seasoned professionals. We'll also reveal the 5 key questions that make it easy to add value and customization to your group fitness class (p. 55). Our goal within the pages of *American Fitness* is to continue to inspire and educate, helping you to fulfill your love for transforming people's lives. Every day is an opportunity to reignite your passion, open your mind and make positive changes that can impact everyone's future. The new year is just the starting point. And I'm excited to be joining you on the journey ahead.

Warm Wishes,

Laurie McCartney
President – Global Fitness & Wellness Solutions

WHAT'S NEW

AFAA'S NEW SUSTAINING MOBILITY AND MOVEMENT SERIES (RELEASE #1)

Moving efficiently is key to performance and longevity for you and your participants. In this first release of the Sustaining Mobility and Movement Series, called *Human Movement Science,* you'll learn to assess participants across different group formats to identify movement dysfunctions and identify common muscular imbalances that could potentially lead to injury. Using these observations, you'll be able to make adjustments that address individual needs while also providing a successful group experience, all of which will help you keep participants performing at their best. In addition, the course is worth 7 AFAA CEUs. Check it out at afaa.com/courses/human-movement-science.

NASM CORRECTIVE EXERCISE SPECIALIZATION: UPDATED AND ELEVATED!

Corrective exercise is one of the most important components of a comprehensive exercise program. Regardless of athletic ability or fitness level, almost every person has some degree of dysfunction that increases the chance for injury. The NASM Corrective Exercise Specialization (CES) now contains even more application-based learning features, including new exercise and technique cuing videos, interactive learning modules, and client scenarios to help you increase your expertise and value. For more details about the program and additional learning options and CEUs, visit www.nasm.org/ces.

WE'VE TEAMED UP FOR YOUR LIABILITY COVERAGE

As a fitness trainer or instructor, you work long and hard to perfect your craft and provide your clients and participants with the best experience and outcome. But all it takes is one client or participant injury to put your business in jeopardy. To help you protect yourself against such claims, NASM and AFAA have teamed up with InsureFitnessProfessionals.com to offer our members access to critical liability insurance via easy online enrollment at highly competitive rates. More information can be found on insurefitnessprofessionals.com.

NEW MUSIC LIBRARY FOR GROUP FITNESS INSTRUCTORS: YES!GO

Yes!GO combines all the music tools you need in one easy-to-use app, available for iOS and Android. With the tap of a button, you can access hundreds of ready-to-go mixes, create your own custom mixes, adjust the tempo of any song (plus or minus 30%), and add interval timers that seamlessly play right over the music. This is a tool that can save you time, money and hassle, while also giving you access to the variety of music you need to stay motivated and inspired…so you can motivate and inspire everyone else. Check out the special offer for AFAA subscribers at yesfitnessmusic.com/afaa.

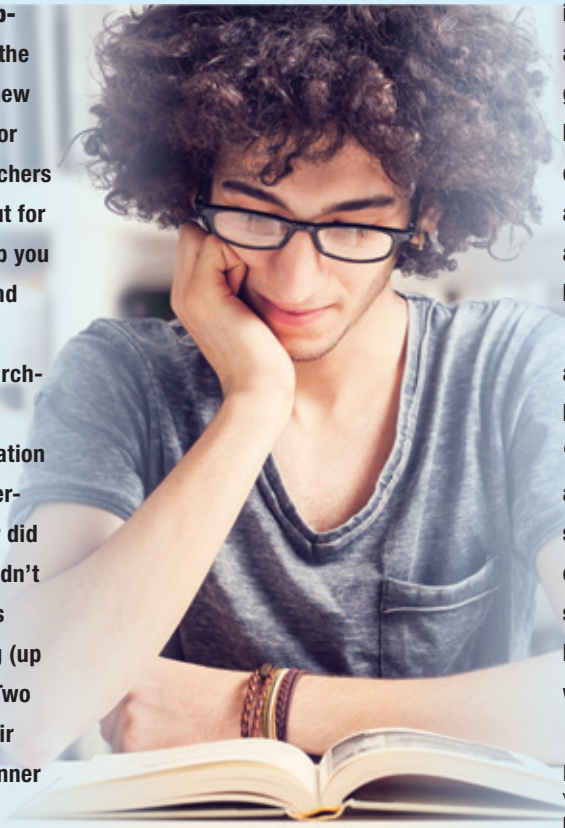
BY LAURA QUAGLIO

REDUCE THE RISK OF ACL Re-Injury

After anterior cruciate ligament reconstruction surgery, young athletes who play sports are especially at risk for tearing their ACL again. However, experts from the Norwegian Research Center for Active Rehabilitation say screenings and rest can offer a measure of protection. In particular, a reduced risk of re-injury has been seen among athletes who waited until their quadriceps were symmetrical in strength before returning to play. Patients also slashed their risk by half for every month they stayed off the field after surgery, up to the 9-month mark.

TO AVOID THE KNIFE, CHECK QUAD SYMMETRY BEFORE RETAKING THE FIELD.

To Boost Memory, TIME Workouts Later



Need to lock in a few facts for an upcoming exam or cert test? Don't hit the gym right after hitting the books. In new research from the Donders Institute for Brain, Cognition and Behavior, researchers discovered that delaying your workout for 4 hours after a study session can help you better absorb what you've learned, and retrieve it.

In this single-session study, researchers divided 72 participants into three groups and gave them 90 picture-location associations to review. One group exercised immediately afterward, another did so 4 hours later, and the last group didn't work out at all. Each of the exercisers logged 35 minutes of interval training (up to 80% HRmax) on an exercise bike. Two days later, all three groups tested their recall while hooked up to an MRI scanner (van Dongen et al. 2016).

"We found that performing exercise 4 hours, but not immediately, after encoding improved the retention of picture-location associations compared to the no-exercise group," the study's researchers say. Furthermore, when participants in the delayed-exercise group chose a correct answer, the brain images showed more activity in the hippocampus (a part of the brain integral to learning and memory).

"Our results suggest that appropriately timed physical exercise can improve long-term memory," the study concludes, "and highlights the potential of exercise as an intervention in educational and clinical settings." Moreover, this study supports children's participation in after-school sports and physical training, and it highlights an interesting benefit worth sharing with adult clients, too.

REFERENCE:
VAN DONGEN, E.V., ET AL. 2016. PHYSICAL EXERCISE PERFORMED FOUR HOURS AFTER LEARNING IMPROVES MEMORY RETENTION AND INCREASES HIPPOCAMPAL PATTERN SIMILARITY DURING RETRIEVAL. *CURRENT BIOLOGY, 26* (13), 1722–27.

A Milestone in Wearable Tech

HIGH-TECH EMBROIDERY WILL ALLOW CLOTHES TO "TALK" TO YOUR SMARTPHONE, SHARING DATA ON ATHLETIC PERFORMANCE.

Jo McCulty, courtesy of The Ohio State University

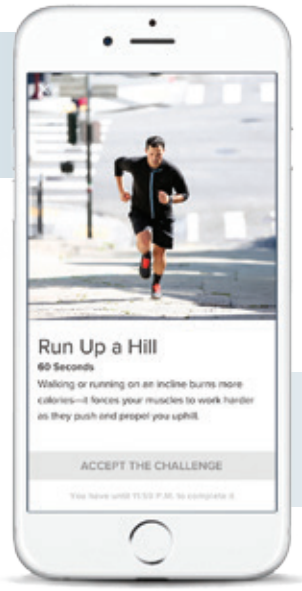
Researchers at The Ohio State University are developing embroidered antennae and circuits with 0.1-mm precision—an optimum size for embellishing fitness apparel with sensors that aren't bulky or uncomfortable. "A revolution is happening in the textile industry," says John Volakis, PhD, recent director of the Electro-Science Laboratory at Ohio State, who is developing this technology along with research scientist Asimina Kiourti, PhD. "We believe that functional textiles [aka e-textiles] are enabling technology for communications and sensing—and one day even medical applications like imaging and health monitoring."

This year's embroidery is a vast improvement over the duo's initial attempts in 2014. Today's threads are finer, the process costs a fraction of what it did before and the work can be accomplished in half the time. (It takes just 15 minutes to create the circuitry swirl shown at left.)

Stay tuned: You're likely to soon see this tech on athletic gear, sharing performance data with the wearer's smartphone or tablet.

UNLOCK VIEWS, NOT PIKACHUS

Running the TCS New York City Marathon in 2017 just got easier: The only qualifier needed to make this dream a virtual reality is a Fitbit tracking device. The Fitbit Adventures feature on the free Fitbit mobile app allows users to complete this famed race course through a series of mini challenges based on user ability. Each day's steps unlock hidden treasures and health tips, and panoramic photos transport users to the Big Apple, allowing them to enjoy iconic landmarks panorama-style simply by rotating their phone (think Google Maps street view).



"FITBIT CHALLENGES" INSPIRE USERS TO MOVE ABOUT 1 EXTRA MILE PER DAY.

A POSITIVE OUTLOOK ON EXERCISE EQUALS GREATER MIND-BODY BENEFITS.

Photo by Arie Mastenbroek

Exercise and the PLACEBO Effect

Turns out *The Little Engine That Could* isn't pure fiction. A recent study from the Albert Ludwig University of Freiburg in Germany revealed that "our belief in how much we will benefit from physical activity has a considerable effect on our well-being in the manner of a self-fulfilling prophecy," according to researcher Hendrik Mothes, a sports psychologist and PhD student in the school's Department of Sport Science.

The research, published in the *Journal of Behavioral Medicine* (2016), looked at participants' perceptions of the health benefits of workouts, as well as their well-being and mood, before and after they rode a bicycle ergometer for 30 minutes. Those who entered the study with a positive attitude on exercise reported greater enjoyment of the workout, plus greater mood improvement and anxiety reduction, than did those who were more skeptical at the start. When brain activity was measured after the ride, the exercise optimists also showed greater relaxation at the neuronal level, and so did participants who had watched a brief pre-ride film that touted the benefits of cycling.

Mothes reports that positive expectations could have long-reaching effects on a person's desire to maintain an exercise program. The takeaway for fitness professionals: Continue to accentuate the positives of exercise with your clients. The more they believe, the more they may achieve—and the more likely they are to enjoy the journey.

REFERENCE:

MOTHES, H., ET AL. 2016. EXPECTATIONS AFFECT PSYCHOLOGICAL AND NEUROPHYSIOLOGICAL BENEFITS EVEN AFTER A SINGLE BOUT OF EXERCISE. *JOURNAL OF BEHAVIORAL MEDICINE*. DOI:10.1007/S10865-016-9781-3.

WHAT'S THE BEST CLASS LENGTH TO ENCOURAGE UTILIZATION?

PLANET FITNESS OPENS FIRST "JUDGEMENT-FREE" YOUTH GYM

Planet Fitness recently opened a mini gym in the Boys & Girls Club of Manchester, New Hampshire, as part of its national antibullying initiative called The Judgement Free Generation™. For this philanthropic initiative, Planet Fitness partnered with the Boys & Girls Clubs of America and STOMP Out Bullying™ to encourage teens to promote a culture of kindness and support in their communities.

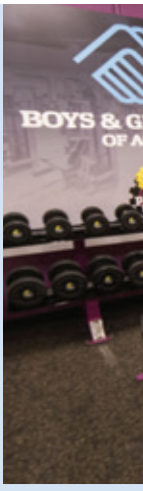
"What makes Planet Fitness unique is we're all about making people feel welcome and accepting them for who they are," says McCall Gosselin, vice president of public relations and communications. "We wanted to extend that philosophy from our clubs into our community."

To that end, the Manchester gym will give nearly 1,700 kids and teens access to an elliptical machine, treadmill and free weights in a nonintimidating environment, all for just $25 per year. Its walls, painted in the company's signature purple and yellow hues, share the company's larger-than-life message: "You Belong."

Diane Fitzpatrick, CEO of Boys & Girls Club of Manchester, says this gym solves a critical need among youth. "The fitness center allows us to reinforce the importance of living a healthy lifestyle, both physically and emotionally," says Fitzpatrick. "We are confident that it will make a huge impact on our kids' and teens' overall health and help build their confidence and self-esteem."

Planet Fitness and its franchisees plan to construct additional "mini Judgement Free Zones®" in Boys & Girls Clubs throughout the country.

Want to support kids and teens in your area? Check out the NASM™ Youth Exercise Specialization (YES), and help today's youth embrace a healthy, positive lifestyle in a way that meshes with *your* personal mission and message.



IF you're rethinking your session schedule for 2017, recent survey results (Stromgren 2016)) may help you make an informed decision. Two major players in the fitness industry recently shared their findings on 2015 health club and studio usage, including facts on timing.

ClassPass, a fitness-class subscription service, revealed that sessions lasting 45–55 minutes were better attended than those in the 60- to 90-minute range. In fact, some locations reported that utilization was up to 63% greater for the shorter workouts. (In this case, utilization refers to how many available class slots were booked per session.)

Other timing issues influenced attendance, too. Cloud-based business management software platform MINDBODY reported that Sunday classes were the least popular, but that late-night workouts are on the rise. In fact, workouts between 9 p.m. and midnight have shown a 48-fold increase since 2005. Before switching things up too much, though, do a quick survey of your own clients—formally or informally—to find out their thoughts on class schedules.

REFERENCE:
STROMGREN, E. 2016. CLASSPASS, MINDBODY STUDIES HIGHLIGHT HEALTH CLUB AND STUDIO USER ACTIVITY TRENDS. *CLUB INDUSTRY.* HTTP://CLUBINDUSTRY.COM/BLOG/CLASS PASS-MINDBODY-STUDIES-HIGHLIGHT-HEALTH-CLUB-AND-STUDIO-USER-ACTIVITY-TRENDS.

THIS FACILITY HELPS YOUTH BUILD STRENGTH AND SELF-ESTEEM WHILE IT DISCOURAGES BULLYING.

Photos courtesy of Planet Fitness

"NO TIME TO EXERCISE?" *Do the Math.*

QUICK HEALTH FIX: 10 MINUTES OF HIIT OFFERS THE PERKS OF 50 MINUTES OF MODERATE AEROBICS.

In a recent study, one group of sedentary men did 10-minute sessions of high-intensity interval training, while another group did moderately intense workouts lasting 50 minutes each. After 12 weeks of thrice-weekly workouts, both groups showed equal cardiovascular improvements (Gillen et al. 2016).

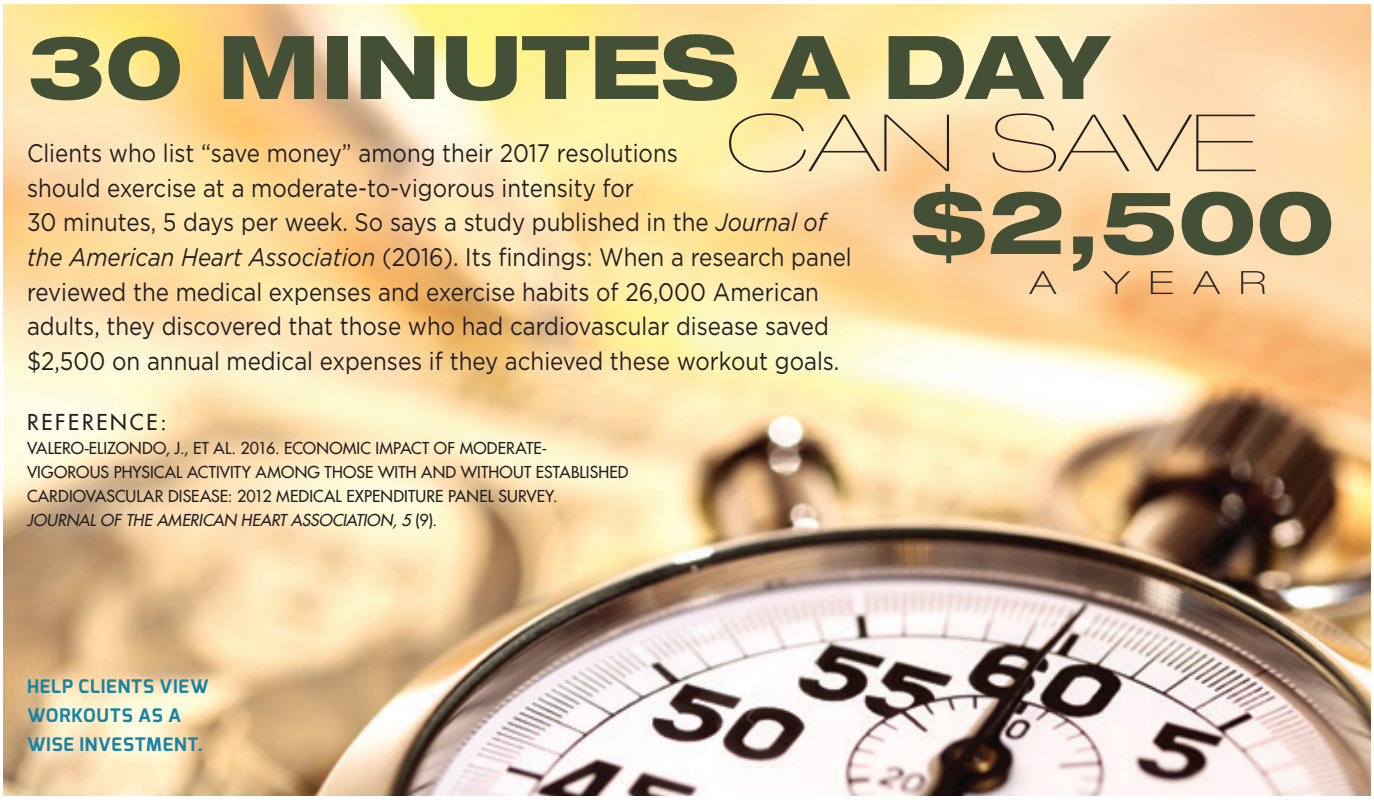
REFERENCE:
GILLEN, J.B., ET AL. 2016. TWELVE WEEKS OF SPRINT INTERVAL TRAINING IMPROVES INDICES OF CARDIOMETABOLIC HEALTH SIMILAR TO TRADITIONAL ENDURANCE TRAINING DESPITE A FIVE-FOLD LOWER EXERCISE VOLUME AND TIME COMMITMENT. *PLOS ONE 11* (4), E0154075.

30 MINUTES A DAY CAN SAVE $2,500 A YEAR

Clients who list "save money" among their 2017 resolutions should exercise at a moderate-to-vigorous intensity for 30 minutes, 5 days per week. So says a study published in the *Journal of the American Heart Association* (2016). Its findings: When a research panel reviewed the medical expenses and exercise habits of 26,000 American adults, they discovered that those who had cardiovascular disease saved $2,500 on annual medical expenses if they achieved these workout goals.

REFERENCE:

VALERO-ELIZONDO, J., ET AL. 2016. ECONOMIC IMPACT OF MODERATE-VIGOROUS PHYSICAL ACTIVITY AMONG THOSE WITH AND WITHOUT ESTABLISHED CARDIOVASCULAR DISEASE: 2012 MEDICAL EXPENDITURE PANEL SURVEY. *JOURNAL OF THE AMERICAN HEART ASSOCIATION, 5* (9).



HELP CLIENTS VIEW WORKOUTS AS A WISE INVESTMENT.

The Dehydration Equation

Clients in colder climes may need a reminder to boost their fluid intake during outdoor exercise this time of year. "Becoming dehydrated is a major mistake made by winter athletes," says Nancy Clark, MS, RD, CSSD, in *Nancy Clark's Sports Nutrition Guidebook* (Human Kinetics 2014). In one study that compared skiers to football and soccer players, Clark says, those who hit the slopes had the highest rate of chronic dehydration.

Many factors cause athletes to underhydrate in winter. Cold temps may blunt thirst, and high altitude can dampen appetite, causing exercisers to limit their water intake from food and beverages alike. Clients may associate heat, not cold, with dehydration, so it might not be on their radar in winter. Or the avoidance of fluids may be intentional, enabling them to take fewer bathroom breaks while wearing a bulky ensemble (Clark 2014).

Clients may be surprised to learn that fluid losses can be even *greater* in winter. When cold, dry air is inhaled, the lungs add warmth and moisture, causing water vapor to be exhaled. (That's why you can "see your breath" in cold weather.) In fact, performing "stressful physical activity" in cold, dry air can boost respiratory water losses by 15–45 mL/hour (IMNA 2005). Wearing insulated winter clothes can further increase losses from perspiration.

Bottom line: When discussing winter sports and workouts, remind clients to monitor beverage intake just as they would in summertime.

REFERENCES:

CLARK, N. 2014. WINTER HYDRATION. IN *NANCY CLARK'S SPORTS NUTRITION GUIDEBOOK* (5TH ED.). CHAMPAIGN, IL: HUMAN KINETICS.

IMNA (INSTITUTE OF MEDICINE OF THE NATIONAL ACADEMIES). 2005. CHAPTER 4: WATER. IN *DIETARY REFERENCE INTAKES FOR WATER, POTASSIUM, SODIUM, CHLORIDE, AND SULFATE.* WASHINGTON, DC: NATIONAL ACADEMIES PRESS.

RODRIGUEZ, N.R., DI MARCO, N.M., & LANGLEY, S. 2009. AMERICAN COLLEGE OF SPORTS MEDICINE POSITION STAND: NUTRITION AND ATHLETIC PERFORMANCE. *MEDICINE AND SCIENCE IN SPORTS AND EXERCISE 41,* (3): 709–31.

LAURA QUAGLIO *has more than 18 years of experience as a writer and editor for numerous magazines, books and websites on such diverse topics as wellness, nutrition, fitness, finance, after-school activities and parenting. She is also a mother of two, second-degree black belt, adventure-race fan and costume designer for the local high school's musicals.*

LOWER CROSSED SYNDROME

STARTING FROM CENTER

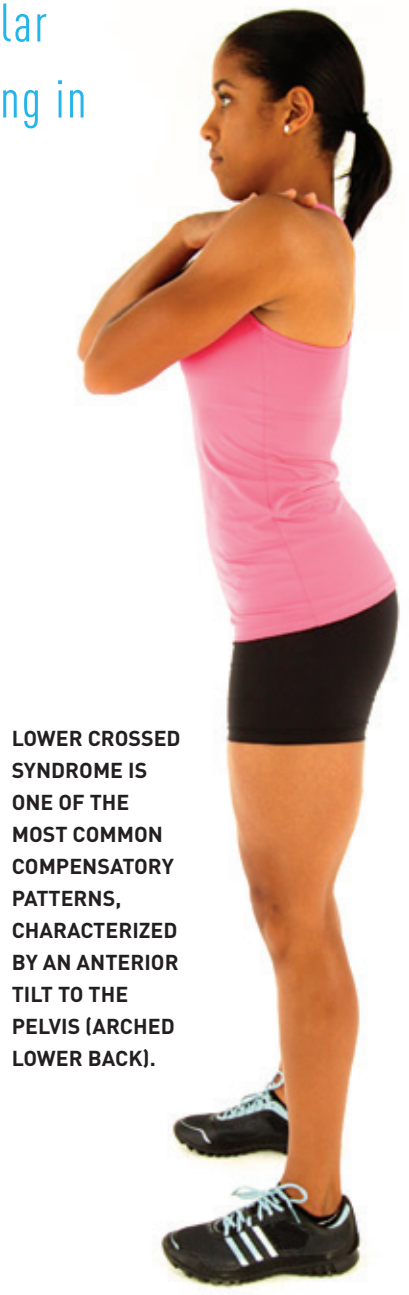
How to help correct muscular imbalances caused by sitting in place for too long.

BY KENNETH MILLER, MS

In recent years, we've heard a lot about the ill effects of prolonged sitting. Articles, blog posts and TV news segments all point to rising pains and diseases thanks to sedentary lifestyles. Sitting for a long time every day promotes imbalances in muscular length and strength. The question for personal trainers and movement-based professionals is how to help correct these imbalances.

The side effects of a sedentary lifestyle often show up in the lumbo-pelvic-hip complex, where a condition called lower crossed syndrome (LCS) produces an increased forward tilt of the pelvis that coincides with an excessive lower-back arch. Holding this static position constantly can create or contribute to muscle imbalances in the pelvic region. Unfortunately, this uneven pull of muscles has effects beyond the lumbo-pelvic-hip complex, strongly influencing the regions above and below as well.

It's important to observe the pelvic region because it connects the upper and lower body. As we walk, our pelvis moves forward and back, rotating and tilting as our legs swing with every step. The shoulders and arms swing opposite the legs. This counter-rotation makes the lower back and hips crucial to the integrity of the body overall. If the pelvic region muscles get out of sync, a chain of events ensues that can eventually lead to injury.



LOWER CROSSED SYNDROME IS ONE OF THE MOST COMMON COMPENSATORY PATTERNS, CHARACTERIZED BY AN ANTERIOR TILT TO THE PELVIS (ARCHED LOWER BACK).

Prolonged sitting produces a pattern of over- and underactive muscles in both the front and the back of the hip region. "Crossed" refers to the crossing pattern of the overactive muscles (and possibly tight and shortened) with the countercrossing of the underactive (and possibly lengthened and weak) muscles. This general statement explains potential contributions to this postural characteristic. You'll need to do additional assessments to specifically determine what's causing an individual client's posture problems.

KEY MUSCLE GROUPS

The overactive, shortened and tight muscles include (but are not limited to) the

- hip flexor complex (psoas, rectus femoris, tensor fascia latae)
- adductor complex
- latissimus dorsi
- erector spinae
- gastrocnemius
- soleus

Conversely, the underactive, lengthened and weak muscles include (but are not limited to) the

- gluteus maximus
- gluteus medius
- transversus abdominus
- internal oblique
- anterior tibialis
- posterior tibialis

From a side view of the body, you can see that the back-side latissimus dorsi and erector spinae (overactive) are above the gluteus maximus, medius (underactive). Meanwhile the front side has the transversus abdominus and internal oblique (underactive) above the hip flexor complex (overactive). This pattern of pulling the overactive muscles promotes and exacerbates lower-back arch, while the weakened and lengthened muscles allow it to happen.

SEDENTARY CONSEQUENCES

In an age where careers, communication and recreation depend on stationary and handheld digital technology, people are likely to sit more and exercise less compared to past decades. This increasingly sedentary lifestyle means two things: the weak muscles will continue to get weaker while the short muscles get shorter and tighter. As this imbalance persists, it will increase joint malalignments and movement dysfunction while decreasing joint range of motion—increasing the likelihood of pain and injury.

We see this in the low back and pelvic region when somebody's posture shows an excessive low back arch with an excessive forward or anterior tilt of the pelvis. Pains and discomfort from this posture go beyond the lower back, promoting stress and strain to the knees and hamstrings. This happens because of the femur's connection via the hip flexor complex, gluteal complex and adductor complex. Overactive muscles cause unequal, unbalanced lines of pull, forcing joints and adjacent muscles like the hamstrings to work harder to stabilize and counter these unintended forces.

IDENTIFYING LCS POSTURE

There are multiple ways to identify the LCS posture. These methods can include static posture, where the client shows excessive

LOWER CROSSED SYNDROME: ASSESSMENTS AND OBSERVED RESULTS

Overhead Squat
- observed increased lower-back arch as arms raise during assessment setup
- lower-back arch increases as client descends during squat
- excessive forward lean during descent

Single-Leg Squat
- observed trunk rotation and forward lean during squat
- knee valgus

Pushup Assessment
- observable increase in lower-back arch
- hip dropping to the floor

POSSIBLE CORRECTIVE STRATEGY

Addressing LCS requires an exercise strategy that addresses the muscle imbalances. This must happen before committing to a strength- or power-based exercise program. Until the client can attain—and maintain—a more neutral spine with dynamic postural control, increasing external loads and speeds will only enhance muscle imbalances and increase stress on the joints and surrounding tissue. The better start is to use the 4-step NASM Corrective Exercise Continuum:

STEP 1

Inhibit/Self-Myofascial Release. SMR techniques involve the use of equipment such as a foam roller or lacrosse ball. This can neurologically decrease activity to the overactive muscle, making it easier to recruit the opposing muscle groups.

Technique: Using a foam roller or similar device, slowly roll over region looking for tender areas. Once you find a tender spot, hold position for about 30 seconds (until about 50% decrease in tension).

1A
adductor complex (inner thigh)

1B
rectus femoris (quads)

STEP 2

Lengthen/Static Stretching. Static stretching complements foam rolling by enabling the lengthening of muscle that has been inhibited or relaxed through SMR techniques.

Technique: Get into and hold stretch position for approximately 30 seconds.

2A
standing adductor stretch

3A
floor bridge

3B
quadruped hip extension

STEP 3

Activate/Strengthen.
Strengthening exercises can now be implemented to increase strength and activity in the muscles that have not been working hard enough to counter the previously overactive muscles.

Technique: Perform strengthening exercise with little to no external resistance with slow tempos, emphasizing the eccentric contraction or lengthening portion of the movement. Hold for 2 seconds, 10–15 reps, 1–2 sets.

2B
kneeling hip flexor stretch

STEP 4

Integrate.
Integrated movement patterns coordinate how the brain chooses to use the muscles of the lower back and pelvic region. Without this, there is no calibration of the use of glutes relative to the hip flexors and the erector spinae.

Technique: Use a multi-joint motion with slow, controlled tempo. Do 10–15 reps, 1–2 sets.

4A
TRX®-assisted squat

Photo Courtesy of TRX

lower-back arch and an anterior-tilted pelvic position. You can also use dynamic assessments like the overhead squat, single leg squat, or push or pull assessment. The key is to take a side view that reveals the position of the lumbar spine and pelvis. However, the anterior tilt may require a more closely monitored palpation technique (always get your client's permission before touching), where you identify the location of the anterior superior iliac spine and compare it to the position of the posterior superior iliac spine to see if there is an excessive tilt. This technique requires training in bony-landmark identification.

ADVICE ON PROGRAM DESIGN

Fitness professionals must take care when designing programs. Clients have to be observed as the individuals that they are. Their specific movement patterns need to be respected and addressed appropriately. That way the client's body can have more strength and integrity because the weak points were taken care of first.

Corrective strategies—especially when targeting the lumbo-pelvic-hip complex—may inadvertently "correct" dysfunction in other areas of the body as well. In a society where we move and exercise less than ever, it is that much more important to restore efficiency first and enhance performance second. **AF**

KENNETH MILLER, MS, *is an NASM-CES, PES, and a Pain Free Movement Specialist.*

As a personal trainer and strength coach in the San Francisco and Oakland Bay area, he works with athletes and clients to improve and increase their capacity to move well for different sports and recreational activities. Learn more at www.grouptrainingbiz.com or contact Ken at ken@grouptrainingbiz.com.

BY CHRISTY STEVENSON

HOW TO MODIFY LIKE A PRO

Keep workouts safe, effective and positive for everyone by planning ahead and following these four rules.

In a perfect world, every fitness facility could offer each class at multiple ability and intensity levels, or custom-tailored to each individual's ailments and injuries. But in reality, group fitness instructors must teach to participants with a vast spectrum of fitness levels and biomechanical issues, all in one class!

It's a major difference between group fitness and personal training, and it can have a significant impact on the safety and effectiveness of each individual's workout. Whether you are a new instructor seeking pointers on when and how to modify, or a veteran instructor looking for some fresh ideas, here are four rules to keep in mind when you modify. Put them into practice in your group classes, and you can help ensure every client is getting a workout that meets their needs.

RULE 1: WATCH, OBSERVE AND MODIFY

In order to be an effective group exercise instructor, no matter the modality, you must truly *see* your participants. When you do, you will be better able to anticipate which exercises need adjustments and how to prepare participants to perform them properly.

CHECK YOUR AWARENESS. Ask yourself: What is the average skill level of my class? Which individuals need to be challenged? Which have specific biomechanical issues I should be mindful of? If you cannot answer these questions, you might not be really *seeing* your class. Try to glean answers to these questions during your next session.

CHANGE YOUR POINT OF VIEW. First, be sure the environment allows you to *literally* see each participant. Setting the mood with lighting is fine, so long as you can still observe participants' movement patterns. If you are on a stage, step down and work the room sometimes, checking participants' form and interacting with them. When showing choreography with your back to the class, use the mirror to make eye contact and scan the room to check if they're using proper form. Also simplify some of your movements so that you can face your class and mirror-image them, at least some of the time.

MAKE ADJUSTMENTS ON THE FLY. During class, you must act—often fairly quickly—based upon your observations. This can be difficult, even frustrating. You may have spent hours planning the perfect choreography, and then your participants are just fumbling through it—or standing there, gaping. The oblivious or stubborn instructor plows ahead, thinking, "They'll get it next time." The problem is, the participants might not show up for a next time. That's one reason a wise and ready instructor watches, observes and modifies.

RULE 2: START SIMPLY, ADD SLOWLY

What's the secret to modifying during class without the workout feeling too choppy or too full of options? Start with the basics, and modify up gradually. Don't be too hard on yourself, though:

If you realize midway through class that your workout is too complex, it's okay. Better to modify down than to not modify at all!

START WITH THE BASICS. Base moves are those staple movements that serve as the point of origin for all other exercises in a particular modality. A base move for a dance-fitness class might be a step-touch. The step-touch can increase in complexity by changing the arms, double-stepping in each direction, or changing the leg movement from a "touch" to a hamstring curl or knee lift. A base move in a HIIT class might be a high plank, which can be advanced by adding leg movements like jacks or single arm raises. If you discover a new exercise you want to try in your class, determine what the base move is, and make sure you perform this base move first, either in the warm-up or when setting up the new exercise.

INCREASE COMPLEXITY, ONE STEP AT A TIME. After showing the class the base move, start with the simplest element to change—typically, arm movement patterns. Then show them a lower body option and, last, add any directional and/or tempo changes. Avoid switching multiple elements at once, unless there's a combo that's fairly simple and natural, like an arm-leg movement that's easy for people to pick up.

EXPERIMENT WITH DEMO STRATEGIES. Here are a few different ways to change things up without confusing or frustrating your class. Always remind class members that each modification is *optional.*

- For fast-paced choreography, show modifications at half-time, or continue repetitions until the majority of class members have mastered the new movement pattern.
- Have participants do a base move while you demonstrate a modification. In a dance-fitness class, for example, keep class members doing side steps while you demonstrate the mambo cha-cha.
- Show modifications as you go. Start everyone at step 1 (like single squats), then offer step 2 (squat jumps), then offer step 3 (lateral squat jumps), and so on.
- Demonstrate alternatives during a brief recovery period. In indoor cycling class, for example, use a recovery segment to explain that a seated easy climb is a good modification for people who need a break during the upcoming long standing climb.

Remember, your participants are there to work out, so it's vital to keep them moving as much as possible. Modifications should enhance and improve the workout.

RULE 3: MODIFY WITH PURPOSE

Choose which moves warrant specific modifications. For many exercises, the modification is simple: You make the movement either bigger or smaller. For others, you may need to provide a preparatory movement instead. Use these guidelines to help you decide on your next move.

CONSIDER THE AFAA 5 QUESTIONS. For each exercise, you need to remember: What is the purpose of this exercise? Are you doing that effectively? Does the exercise create any safety concerns? Can you

MODIFYING A BURPEE

A burpee is a great exercise, but many participants may struggle with it. Rather than skip it altogether, you can provide a sensible sequence that prepares each participant for the ultimate move…while also leaving it optional.

What is the main purpose of this exercise?
A burpee improves strength of the lower body, upper body and core with plyometric muscle contractions, while also challenging the cardiorespiratory system.

What are the main elements of this exercise? A burpee consists of a squat jump, a plank hop and a push-up.

What are the prerequisite moves, and what is the best progression? Squat jumps offer a great way to begin, because this part of a burpee is plyometric and taxes the cardiorespiratory system. For anyone who cannot perform high-impact exercise, demonstrate simple air squats without the jump, which still strengthens the leg muscles in the sagittal plane.

A second exercise could be plank hops, which are also plyometric. Then try adding the plank hop to the squat jump. Or add a pushup to a plank hop.

Finally, you could offer the option of doing actual burpees, or participants could stay with a previous exercise.

BURPEE PROGRESSION: SQUAT JUMP ➔ PLANK HOP ➔ SQUAT JUMP WITH PLANK HOP ➔ SQUAT HOP WITH PLANK HOP, PLUS PUSHUP = BURPEE!

maintain proper alignment and form for the duration of the exercise? For whom is the exercise appropriate or inappropriate? Once you have decided that an exercise is a safe and effective one for the class as a whole, you can consider what the alternative might be for any participants who find that exercise contraindicative.

THINK ABOUT THE MEMBERS. When you know participants well, you are aware of who has wrist issues, who had recent shoulder surgery, who just had a baby, and so on…and you can anticipate which exercises might be too difficult for whom.

Some modifications can be given directly to an individual, either before class has started or as you work the room during the workout. But because we often have new participants—and because even our "regulars" vary in their abilities from day to day—it's prudent to give most modifications to the entire class.

MODIFY WITH PURPOSE. When modifying an exercise, the modification should serve a similar purpose, utilize the same muscles, and/or follow a similar movement pattern. Consider these questions:

- What is the main purpose of this exercise? (Is it simply to get the heart rate up? Is it to strengthen a particular muscle group—and if so, is the focus on isometric, isotonic or plyometric strength?)
- What are the main elements of this exercise? What are the prerequisites to master it?
- What is the best progression for this exercise, or what is an alternative exercise that is simpler but works toward the same purpose?

(See "Modifying a Burpee" for a sample question-and-answer exchange.)

Remember: If you are teaching a prechoreographed format, it's still important to ask these questions and to practice variations of the choreography. This way, when you observe a participant struggling, it will be easier for you to simplify the movement patterns without losing your place in the music or getting overwhelmed. When you modify with purpose, your entire class will still be working on the same goal but in different ways.

RULE 4: ESTABLISH AN INCLUSIVE ENVIRONMENT

It does no good to prepare and offer perfect modifications if no one chooses to follow them. You as the instructor need to foster an environment where every class member feels comfortable working at an appropriate self-assessed level. Some ways to ensure this:

DEMONSTRATE ALL THE LEVELS, NOT JUST THE HARDEST. It's important to make sure the class is all about "doing what you can," rather than everyone doing things in unison. Remind participants that it doesn't matter what variation they are doing. What's important is that they are challenging themselves and honoring their bodies and any biomechanical issues they may be dealing with.

OFFER SOME PRAISE. As the instructor, you should make sure that no one feels foolish, weak or less-than when they perform modifications. Instead, praise participants for being mindful and listening to their bodies.

RETHINK HOW YOU TALK ABOUT MODIFICATIONS. Rather than using labels like "beginner" and "advanced," talk specifically about the exercise's intent, like "If you have shoulder issues, do this instead." Often it's our strongest athletes who come in with the worst injuries. Labeling an exercise "beginner" might cause participants to shy away from a much-needed modification. On the other hand, designating it "a good alternative if you have tight hips today" is specific and acknowledges that each day we are different. It's not about judging our bodies but exercising them safely and with integrity.

All instructors, no matter the format or brand, need to know how to meet their participants where they are, providing options when necessary to ensure safety, effectiveness and an inclusive environment. By following these four rules, you can ensure that modifications aren't just an afterthought but a vital element of your class success. **AF**

What's important is that clients are challenging themselves and honoring their bodies and any biomechanical issues they may be dealing with.

CHRISTY STEVENSON, *AFAA-certified instructor, FiTOUR ProTrainer and fitness writer/presenter, has worked in the fitness industry for more than 16 years. She owns the YouTube channel* Real Fit for Real Life. *Follow her on Instagram @realfitforreallife.*

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HOW TO CLICK WITH CLIENTS

Make the most of social media with these tips from a fitness-marketing pro who's been there, posted that.

BY LAWRENCE BISCONTINI, MA

If you don't yet have a strong presence on social media, I can assure you it's worth the time investment. In fact, I have built most of my online business (www.findLawrence.com) using free social media applications to extend my career "beyond the gym" into the realms of author, mentor and public speaker, which has become my company message: *wellness without walls.* Furthermore, my company FG2000 exclusively uses social media to spread its philanthropic mission: to raise fitness standards around the world.

Here are some of my time-tested tips for maximizing free social media resources to boost *your* fitness career.

PUT YOUR BEST FACEBOOK FORWARD: Modify Posts for Ideal Timing and Quality

If you had to choose just one application for social media exposure, most experts agree that Facebook is currently the clear winner. With more than 1.71 billion monthly active users, this resource lets fitness professionals boost productivity, attract new people to their tribe and spread their fitness message via text, photographs and video clips. Try this:

TIME POSTS STRATEGICALLY. Social media professionals recommend making Facebook posts on Thursday through Sunday between 1 p.m. and 4 p.m. That's when most people have a chance to check on, and interact with, social media pages. However, think about your specific client base and consider experimenting with timing or asking what works best for them. (See "Now Share This" on the opposite page for one gym owner's findings.)

MAKE QUOTATIONS COUNT. You can quote me on this: *Avoid posting quotations from other people.* If followers want to know what Mark Twain said on a particular subject, they will consult Google. Instead, share the unique thoughts, insights and lessons *you* have learned. The more your followers discover what's interesting about you, the more you will connect with your tribe.

FOCUS YOUR MESSAGE. Make posts that are: a) motivational, b) educational or c) inspirational. Alternate among these three genres when you post, using photographs and video clips (shot horizontally) to make them more eye-catching. By varying your topics, you'll appeal to a wider audience.

INCLUDE A CALL TO ACTION. Encourage followers to comment and share by asking open-ended questions and using the hashtag #sharethis at the bottom of your post. For example, a group fitness instructor or personal trainer might say, "Our theme next week is intensity. What song most inspires *you* to work harder? Post it here, and I will do my best to incorporate it into our playlist!"

FIND INSTAGRAM GRATIFICATION: Increase the Payoff of Your Visual Uploads

As the saying goes, a picture is worth a thousand words. And the 500 million people who use Instagram each month are proof. Instagram allows the sharing of short video clips, photos and brief messages with few or no written words involved. Instagram can (and should) be linked to your Facebook and Twitter accounts so that one picture will appear on all three sites simultaneously, spreading your message quickly across multiple platforms. Try this:

CHOOSE IMAGES WITH IMPACT. Instagram works best when one strong photo speaks louder than a paragraph. Some good examples include a "before and now" graphic

Now Share This!

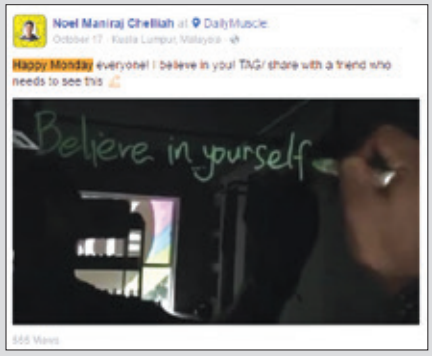
We asked Teresa Hall, owner of Nautilus Family Fitness in Sherman, Texas, how she decides when to post on Facebook.

"Posting at a time when professionals and consumers have a moment to react, share, click or comment, makes all the difference between people just seeing a post and having time to help the message spread," she shares. "I consider the life of my members, and strategically post according to this, avoiding Mondays when everyone is busy with family and work."

Hall has found that her business posts get the most attention and reaction when she targets them for later in the week at 6 a.m., 1 p.m. and 7 p.m. Consider experimenting to see what works best for *your* demographic.

FACEBOOK

Bernadette C. O'Brien alternates among three types of Facebook posts—motivational, educational and inspirational—on her Facebook wall.



Noel Chelliah, a movement coach based in Kuala Lumpur, Malaysia, regularly shares motivating videos on Facebook, inviting fans to "share this with someone who needs to see this message today."

INSTAGRAM

Yury Rockit posts his own quotations to his life coaching clients.

"Avoid posting quotations from other people. Share the unique thoughts, insights and lessons *you* have learned. The more your followers learn what's interesting about you, the more you will connect with your tribe."

of a successful client, or a shot of an oversize check being donated to a charity following a fundraiser at your club.

USE PHOTO-EDITING OPTIONS. Better-quality images are more share-worthy. Instagram offers a variety of easy-to-use effects and filters to help you make smartphone snapshots look as though they were taken by a pro.

KEEP VIDEOS BRIEF. Shorter clips (30 seconds or less) generate more views than longer ones, so keep Instagram videos short, simple and audible.

SET CLIENTS A-TWITTER: Motivate Your Tweets for Maximum Performance

Tweets help spread your thoughts—and, to a lesser degree, visuals—via short statements (140 characters) to Twitter's audience, which includes 313 million users per month. Tweets are not known for generating calls to action, such as having people react to specials and discounts, but Twitter offers an easy way to involve followers in any story important to you. Try this:

AVOID LINKING OUT. Embed graphics in your tweets instead of making your followers click on a link to see a photo or video clip elsewhere.

FOCUS ON PEOPLE. Make the majority of your tweets about client successes instead of delivering a sales pitch for your brand. Profile inspiring clients, classes, colleagues and brand connections. Your tribe will appreciate being a part of your message.

RESPOND TO EVERYONE. If someone retweets or comments about you, that person wants to make a connection. Treat the tweet as if it were a private text message. Respond, show gratitude, and interact in a timely manner so everyone can see how connected you are.

CHANNEL YOUR INNER YOUTUBE STAR: Boost the Intensity of Your Brand's Videos

Think of YouTube as your own television station—one that reaches 1 billion people and stars you and your company. Unlike Facebook, which stores video posts chronologically, YouTube allows you to *organize* your video clips by topic, making them easier to search. Of course, it's a great idea to share your YouTube videos on Facebook to increase their exposure. Try this:

CREATE A CHANNEL. Two types of channels—the user channel and the brand channel—are cost-free, but the latter offers extras like a larger header and a background image. Use the tools available to create your own YouTube channel, complete with playlists, and encourage your tribe to comment on the videos you post.

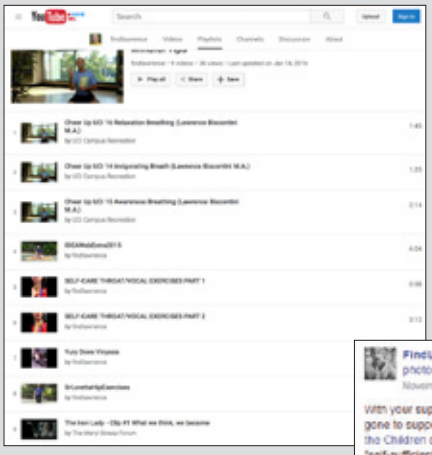
ORGANIZE VIDEOS IN PLAYLISTS. YouTube allows users to create individual playlists, which are collections of video uploads organized by topic, such as "core training," "Tabata," "inspirational stories" or "yoga." Your followers can easily home in on info that interests them, and you can include these playlists on your channel.

CHOOSE AN INTERESTING THUMBNAIL. The

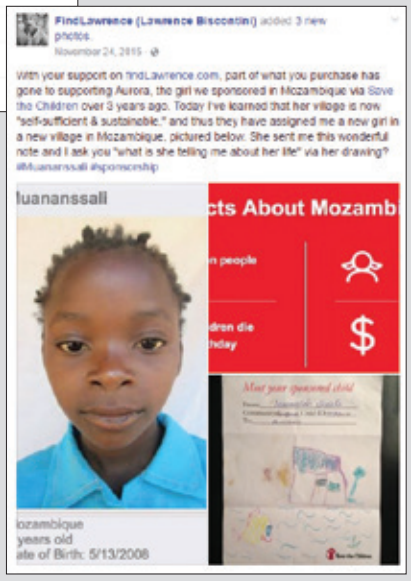
TWITTER

This is what it looks like when a photo is embedded in a Tweet. Here, fitness writer/blogger and subject matter expert Amanda Vogel, MA, shares some social media tips of her own.

YOUTUBE



This is my Playlist view on my Youtube channel, findlawrence.



Sponsoring Aurora via Save the Children in Mozambique meant that a portion of every purchase on my website at the time was donated to fund a sponsorship. When I received my first communication from Aurora, I posted, "What do you think she is trying to tell me in this post via pictures only, since we speak different languages?" Within 1 hour, this post generated more than 750 comments.

PHILANTHROPY

image you select to represent your video in searches should be compelling enough to make people want to view the clip in its entirety. Usually this means pulling from the middle of the video rather than the start or finish.

USE CONTENT THAT YOU OWN. It's best to own all of the material appearing in any of your clips, including music and choreography, to be sure that you act ethically and follow all music, content and other copyright laws. Currently, both YouTube and Facebook have teams that peruse all posts to search for any possible infringements and, when found, take action by removing material and granting "strikes" against personal and professional accounts. The most common infringement occurs with background music. If your clip requires music, consider making your own music on apps like GarageBand or hiring custom music through an inexpensive source like fiverr.com. You can also license (rent) music through sites like powermusiclicensing.com, which is used by cheer teams, dancers, video game designers and others.

BE SOCIAL!

All of the social media outlets here can help you spread your message and build your tribe. Whereas Facebook makes you the host of an online party, Instagram showcases photographs, Twitter highlights words and YouTube features short television shows.

Get some practice using the tips in this article by interacting with AFAA's and NASM's social media channels:

Facebook:
facebook.com/personaltrainers
facebook.com/afaa.fit

Twitter:
@NASM; @afaa_fit

Instagram:
nasm_fitness
afaa_certified

YouTube:
youtube.com/user/NASMorg
youtube.com/user/AFAAfitness

Together, we can use the power of social media and technology to spread our fitness messages across the globe. **AF**

How to Play Tag

Attention to detail can improve exercise form (and results)—and the same holds true for social media postings. Using the right tags makes it easier for people to access your message, and it can strengthen your fitness tribe.

Deirdra Martinez, group fitness instructor for Equinox Fitness Clubs in Los Angeles and creator of The Uplift Movement®, makes it a point to tag students appearing in her video clips. "[They] love when I know their names, call them out for making motivating progress and showcase their energy," she says. "I think of my Facebook wall really as a wall about *them* instead of me."

TAG PEOPLE, PRODUCTS AND PLACES

If a colleague shows you a new movement tip, you could post a selfie of the two of you sharing that skill. However, if you *also* tag your colleague, the manufacturer of the equipment you are using, and the gym where you are working out, you exponentially increase visibility of your message as soon as you hit *enter*.

USE HASHTAGS WISELY

These make posts easier to track and search, but more isn't always better. I advise limiting them to three (or fewer), each with a specific focus:

Your brand hashtag/tagline, such as #findlawrence, #yuryrockit, #fitnessby___ or #bodyweightbybrad. (Include this verbally and visually in every post and clip, and you will boost brand recognition and add cohesiveness to your messaging.)

A descriptive hashtag for that particular post, such as #thisinspiresme, #successstory, #motivatingfitness or #newcoretrainingmoves.

A unique hashtag used only for that post, such as #Mondaymovement, #TRXmoves, #TabataTuesday, or #throwbackThursday. (This will make each post easier to track on its own.) Using three or fewer hashtags keeps your post on track and promotes more visibility of them; readers who see dozens of hashtags stop reading and continue scanning.

EXCEPTION: BE GENEROUS WITH YOUTUBE TAGS!

Before posting a YouTube video, add as many pertinent tags as possible. An upload about performing a plank might have these tags: fitness, exercise, plank, core training, bodyweight exercise, abs and more. Having more tags increases the chances that people will discover it during a keyword search.

In addition to being a social media consultant, **LAWRENCE BISCONTINI, MA,** *is an AFAA and NASM contributing writer, AFAA certification specialist, public speaker and mentor who has created group fitness, personal training and nutrition programming for clubs and spas around the world. Learn more at www.findLawrence.com.*

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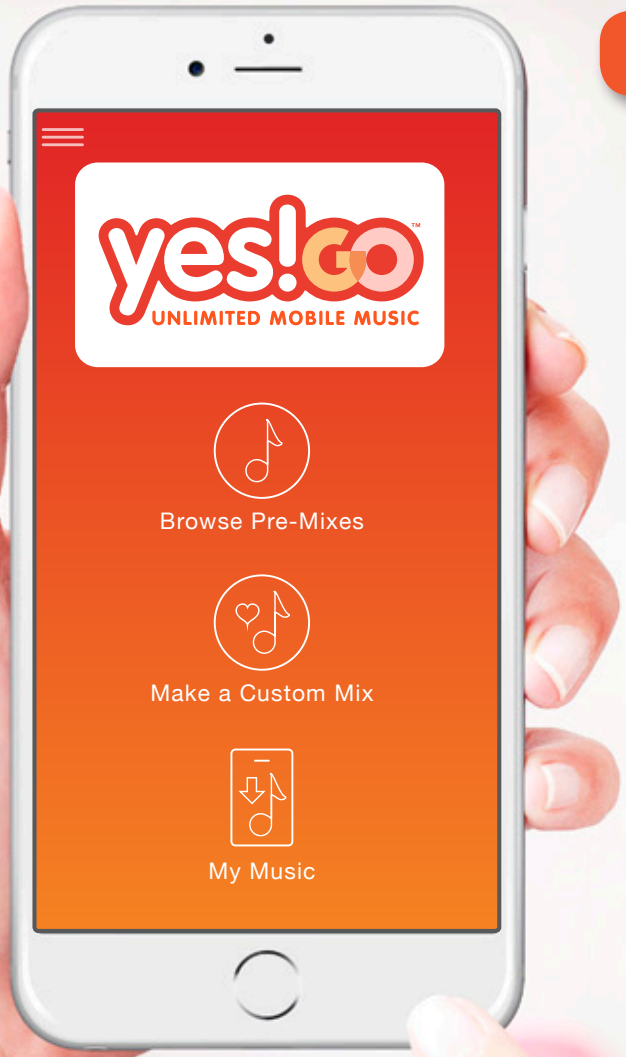

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EXERCISE RECOVERY

BY FABIO COMANA, MA, MS

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EXPLORING *the* SCIENCE *of* RECOVERY

It's crucial to understand how post-exercise strategies can impact the body's ability to heal.

BY FABIO COMANA, MA, MS

Recovery from training is becoming recognized as one of the most important aspects of physical activity and overall wellness. As we sort through the myriad recovery strategies and their varied levels of scientific support, it's important to remember that both scientific and anecdotal evidence point to the value of an appropriate recovery plan to encourage adaptation, wellness and performance.

The ideas outlined in this article cover an array of tactics for enhancing recovery. Although some may prove more effective than others, it's crucial to remember that any interventions will likely work better when tailored to individual clients. Keep in mind that the most effective strategy for you might be to experiment to determine which ones prove feasible and successful for the people you work with.

UNDERSTANDING RECOVERY

We eat, sleep, train, repeat—constantly striving to get bigger, stronger, faster or slimmer—but is there a point where too much becomes harmful? Many recognize the need for recovery after exercise, but do we understand what it takes to fully recover and whether we have actually achieved that state? We hear terms like *overtraining* and *nonfunctional overreaching* (the threshold just prior to overtraining) and wonder "Why do they get so much attention today?"

Answering these questions starts with a basic understanding of homeostasis, stress and recovery within the body.

- **Homeostasis** is a state of balance within the body that occurs when the variables in a system (e.g., pH, temperature) are regulated to keep internal conditions stable and relatively constant (Pocari et al. 2015).
- **Stress** is a stimulus that overcomes (or threatens to overcome) the body's ability to maintain homeostasis. In this article, we will focus on stress related to exercise, which includes physiological (e.g., muscle tears, dehydration, pain) and chemical (e.g., blood imbalances of acid-base or oxygen-carbon dioxide). Other common types of stress are environmental (e.g., cold, humidity), psychological (e.g., finances), emotional (e.g., fear, anxiety) and social (e.g. interpersonal conflicts).
- **Recovery** is the body's process for restoring homeostasis.

The human body is designed to tackle stress—we either adapt or perish (hence the concept of "survival of the fittest").

An intense, acute bout of physiological stress followed by adequate recovery, which enables adaptation and restores homeostasis, is generally considered healthy (Sapolsky 2004). However, physiological stress that is *not* followed by adequate recovery can, over time, compromise homeostasis and immune function, increasing the probability of injury, illness and the onset of nonfunctional overreaching or overtraining. Considering these implications, it's no surprise that experts have turned their attention to studying stress and recovery.

TYPES OF RECOVERY

Though recovery is a critical phase of the exercise-adaptation cycle, it is among the least understood and most under-researched components of training. Essentially, recovery is a process that includes rest, refueling, rehydration, regeneration (repair), resynthesis, reduction of inflammation and restoration that ultimately returns the body to homeostasis. Jonathan Ross, a highly recognized and respected trainer from Baltimore, advises his clients that if they're "hitting it hard," then they need to devote equal time to "quitting it hard" to appropriately recover.

It's helpful to think of three categories of recovery:

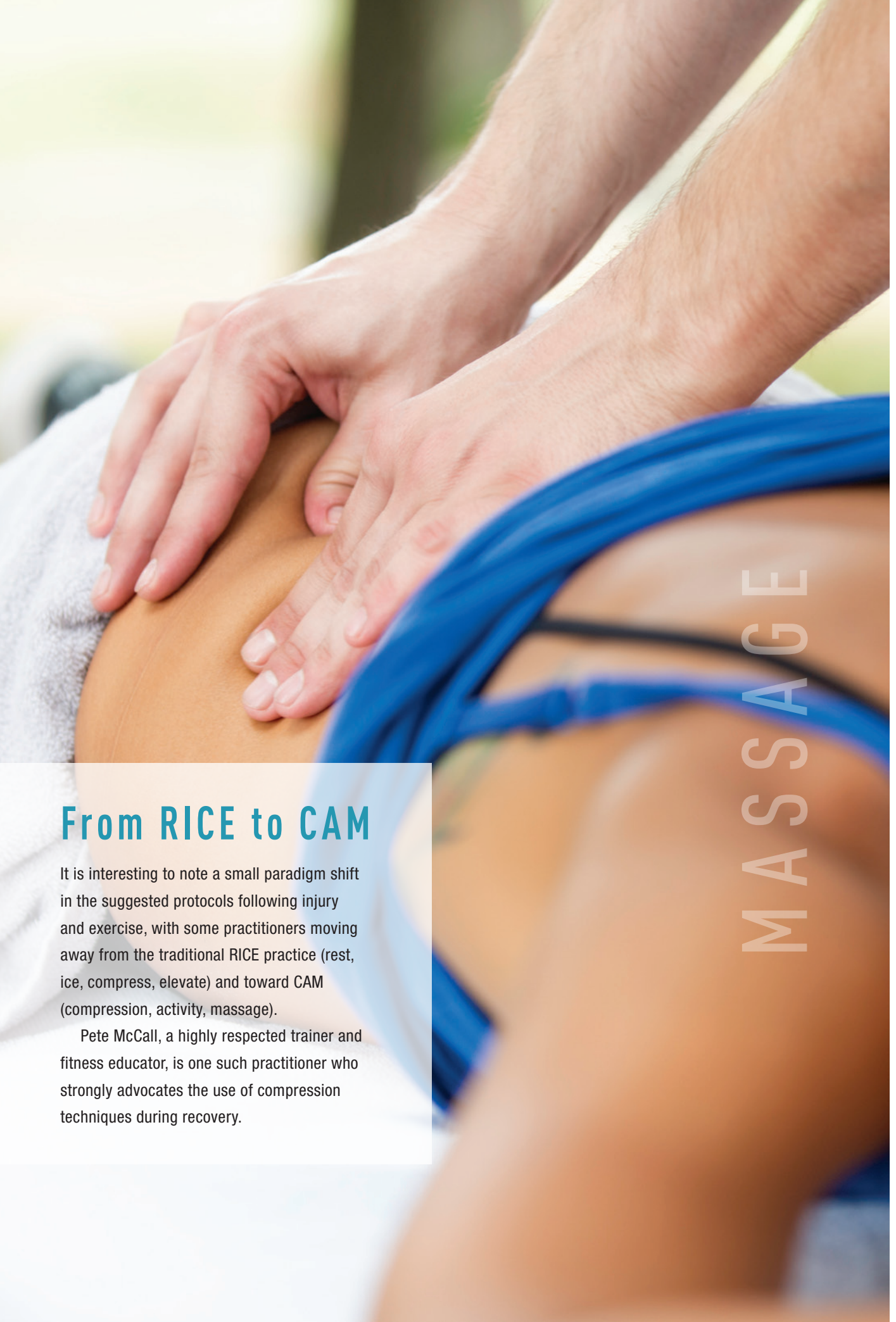
- **Immediate recovery**, which happens in the short time between successive efforts, e.g., between repetitions within a set of biceps curls
- **Short-term recovery**, which happens between sets, e.g., between interval sprints or weight training sets
- **Training recovery**, which happens between workouts or competitions (Bishop et al. 2008)

Focusing on training recovery offers the greatest potential benefit because everything that happens outside of an exercise session—i.e., life—has a potential impact. Hence, the need to ask: Are we truly recovering from training, given the body's perception of stress and the hectic schedules many of us keep? Furthermore, how do we measure or monitor recovery?

MONITORING RECOVERY

Usually, an evening of restful sleep coupled with good nutrition and hydration will restore homeostasis and full recovery (Pocari et al. 2015). However, we can now monitor various physiological parameters in real time to validate recovery and improve the recovery process. For example, measuring resting heart rate (RHR), heart rate variability (HRV) and ventilation (breathing) patterns can provide valuable information on the dominance of our sympathetic nervous system (SNS) or parasympathetic nervous system (PNS), the latter of which is responsible for rest, repair and recovery. It's also helpful to review the scientific evidence for six specific means of achieving

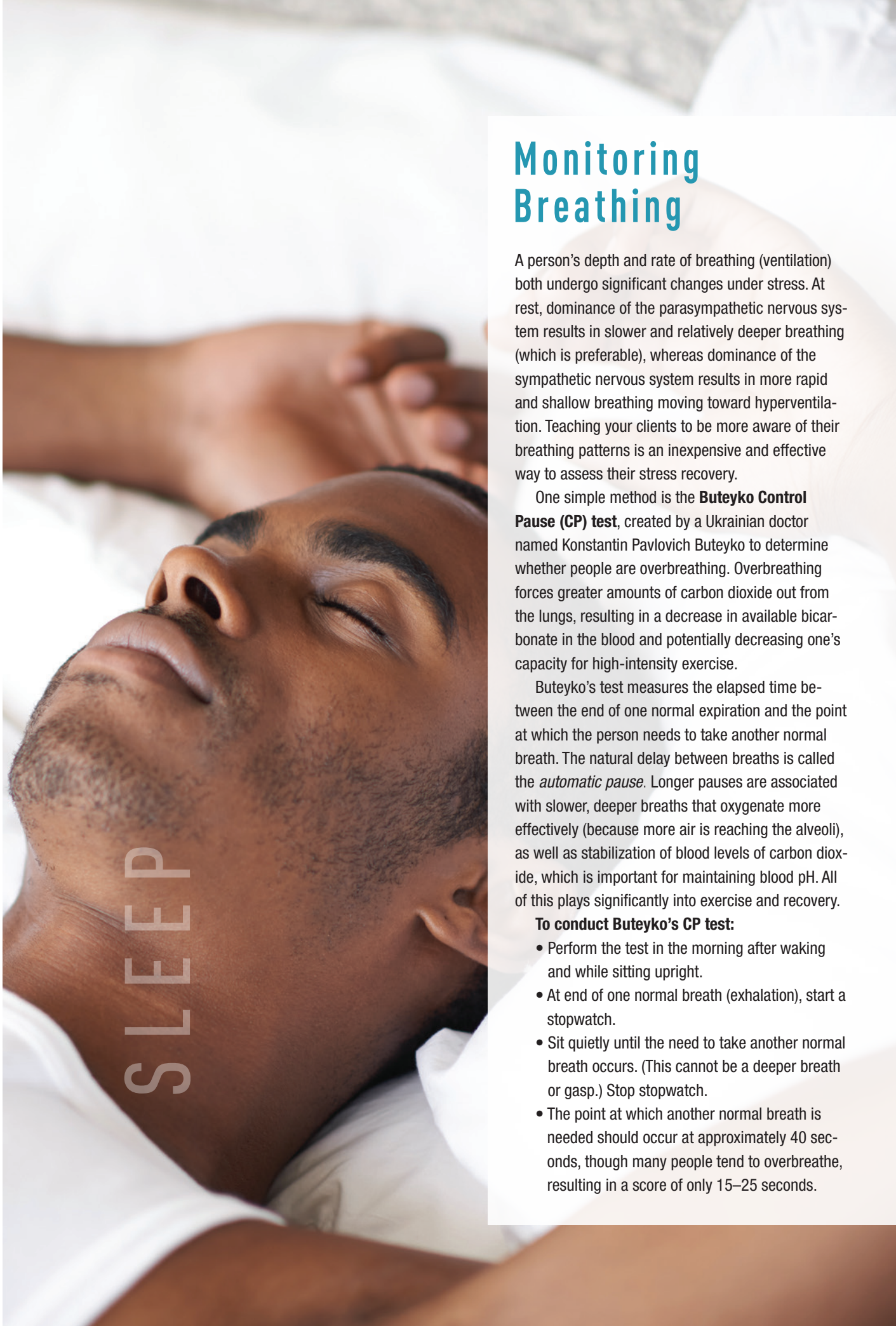
Continued on page 31



From RICE to CAM

It is interesting to note a small paradigm shift in the suggested protocols following injury and exercise, with some practitioners moving away from the traditional RICE practice (rest, ice, compress, elevate) and toward CAM (compression, activity, massage).

Pete McCall, a highly respected trainer and fitness educator, is one such practitioner who strongly advocates the use of compression techniques during recovery.



SLEEP

Monitoring Breathing

A person's depth and rate of breathing (ventilation) both undergo significant changes under stress. At rest, dominance of the parasympathetic nervous system results in slower and relatively deeper breathing (which is preferable), whereas dominance of the sympathetic nervous system results in more rapid and shallow breathing moving toward hyperventilation. Teaching your clients to be more aware of their breathing patterns is an inexpensive and effective way to assess their stress recovery.

One simple method is the **Buteyko Control Pause (CP) test**, created by a Ukrainian doctor named Konstantin Pavlovich Buteyko to determine whether people are overbreathing. Overbreathing forces greater amounts of carbon dioxide out from the lungs, resulting in a decrease in available bicarbonate in the blood and potentially decreasing one's capacity for high-intensity exercise.

Buteyko's test measures the elapsed time between the end of one normal expiration and the point at which the person needs to take another normal breath. The natural delay between breaths is called the *automatic pause*. Longer pauses are associated with slower, deeper breaths that oxygenate more effectively (because more air is reaching the alveoli), as well as stabilization of blood levels of carbon dioxide, which is important for maintaining blood pH. All of this plays significantly into exercise and recovery.

To conduct Buteyko's CP test:

- Perform the test in the morning after waking and while sitting upright.
- At end of one normal breath (exhalation), start a stopwatch.
- Sit quietly until the need to take another normal breath occurs. (This cannot be a deeper breath or gasp.) Stop stopwatch.
- The point at which another normal breath is needed should occur at approximately 40 seconds, though many people tend to overbreathe, resulting in a score of only 15–25 seconds.

Continued from page 28

it: active recovery, massage, compression, cryotherapy, hydrotherapy and sleep. (To learn more about monitoring RHR, HRV and breathing, see the sidebars in this article.)

Active Recovery

Two studies highlight the value of active recovery, which typically uses movements ranging from spurts of anaerobic activity to very light-intensity activity (e.g., cool down). The idea is to accelerate the removal of lactate and hydrogen from muscles while stimulating blood flow and signaling proteins (to initiate healing/adaptation) into the localized tissue.

One study found that active recovery after repeated intense exercise resulted in faster returns to homeostasis compared with passive recoveries that used no movement (Ahmaidi et al. 1996). Another study found that following high-intensity work with active recoveries performed at 60–100% of lactate threshold helped muscles recover faster than did more passive recoveries performed at lower intensities at 0–40% of lactate threshold (Menzies et al. 2010).

Massage

Advocates of massage say it decreases muscle soreness, pain and stress, improves circulation and lymphatic flow, and creates an enhanced perception of recovery. Researchers, however, have questioned its value and warn of its potential to create more muscle damage if performed too aggressively or too soon after exercise (Schaser et al. 2007; Wiltshire et al. 2010).

One study discovered that massage performed immediately after exercise resulted in reduced blood flow and impaired removal of lactate and hydrogen ions from muscles, thereby slowing recovery (Wiltshire et al. 2010). By contrast, other researchers discovered increased muscle activation and proprioception, and reductions in delayed onset of muscle soreness (DOMS) with massage (Shin & Sung 2014).

In yet another study that examined cycling performances separated by 24 hours, massages were found to be superior to passive recovery, but a combination of active recovery and cold-water immersion provided slightly greater benefits than massage (Lane & Wenger 2004). Despite massage's popularity, few reports demonstrate positive effects on repeated exercise performance. Consequently, we still cannot say if massages are truly effective at influencing muscle and overall recovery.

Compression

Delivered via clothing or through inflatable devices (e.g., pulsatile pneumatics), compression is believed to alleviate muscle fatigue and soreness, accelerate lactate and metabolic byproduct removal, reduce muscle stiffness, increase venous and lymphatic flow and muscle oxygenation, and accelerate recovery while also improving performance. Various studies examining the effects of elastic compression (i.e., fabrics) and pneumatic compression (e.g., prosthetics) have generally concluded that both benefits and drawbacks do exist, but without any risk of harm (O'Donnell et al. 1979; Miyamoto et al. 2011; Cochrane et al. 2013).

Elastic compression clothing (which incorporates constant pressure) appears to reduce some muscle soreness and perception of fatigue, but it also slows the removal of metabolic byproducts. Pneumatic compression (which incorporates pulsatile pressure) tends to have a greater effect on increasing blood flow and decreasing muscle stiffness, but it offers little or no improvement in power, strength or performance. Miyamoto et al. examined markers of muscle damage (e.g., creatine kinase, interleukin-6) and found no clear evidence of attenuation of these markers with compression that would indicate accelerated

Monitoring Heart Rate

Monitoring **Resting Heart Rate (RHR)** can be done simply by having the client take his pulse manually or by using a wrist device or heart rate monitor. You can determine a client's RHR by averaging several of his heart rate measurements over a 5-day period, taken when the client wakes in the morning (NASM 2017). In the fitness setting, the client's heart rate should be no more than 8 beats per minute higher than his RHR. If the client's heart rate is higher than that, "it is advised that the client take that day off from training."

Heart rate variability (HRV) is a physiological phenomenon that reflects the time variation (interval) between successive heartbeats. When our parasympathetic nervous system (PNS) dominates, heart rate (HR) varies; it accelerates during inspiration and decelerates during expiration (a healthy sign). By contrast, when our sympathetic nervous system (SNS) dominates, HR shows little variability during breathing (an unhealthy sign).

After we wake from sleep, the body should demonstrate good HRV, which is evidence of PNS dominance, recovery and good health.

HRV is by no means new, as it has been used to predict myocardial infarction risk and other heart-health measures (e.g., diabetes) in medicine for over 40 years.

rates of recovery (Miyamoto et al. 2011). Although research is somewhat minimal on the true effects of compression, there appear to be some small recovery benefits with little concern about harmful side effects (Hill et al. 2014).

Cryotherapy

Cryotherapy temporarily reduces muscle temperature, stimulating vasoconstriction and reducing inflammation and pain. Critics of cryotherapy point to an overall slowing of normal regenerative inflammation and an increasing risk of further injury from extended exposure of skin and nerves to cold temperatures (Schaser et al. 2007). Some practitioners now advocate alternating hot and cold applications, but little research supports this practice.

Although post-exercise cryotherapy remains popular, the reality is that temporary muscle cooling is unlikely to have a significant influence on muscle repair or recovery. Furthermore, in animal-based studies, it did delay recovery (Schaser et al. 2007). Unfortunately, the evidence on cryotherapy's usefulness is weak and inconclusive due to research inconsistencies involving study design, temperature and duration.

Hydrotherapy

The cardiovascular system responds to hydrotherapy (water immersion) by changing heart rate, peripheral blood flow and resistance to flow. It also changes the temperature of the skin, muscles and core, influencing inflammation, immune function, muscle soreness and perception of fatigue. The three most common immersion techniques are cold water immersion (CWI), hot water immersion (HWI) and contrast water therapy (CWT), which alternates immersions between hot and cold water.

These techniques have been extensively examined and appear to have some benefit, although CWI and CWT demonstrate greater benefits than HWI (Halson 2013). In one study, CWI treatment demonstrated lower perceptions of muscle soreness and smaller decrements in muscle strength 24 and 48 hours post-exercise versus CWT (Ingram et al. 2009).

Sleep

The fields of health and medicine recognize the importance of sleep upon overall health and wellness. Sleep and recovery depend on two vital data points:

- **Basal sleep**, which is the amount the body needs every night to recover
- **Sleep debt**, which accumulates if we do not get our basal sleep every night

If sleep debt piles up, rising stress and cortisol accumulation in the body will impair recovery and threaten our health. Considering how much psycho-emotional stress people deal with every day, trainers should take time to inventory the stress their clients or athletes face outside of their workouts and consider the ramifications on recovery and performance. Disregarding or underestimating the importance of sleep may expose your clients to a higher risk of nonfunctional overreaching or overtraining.

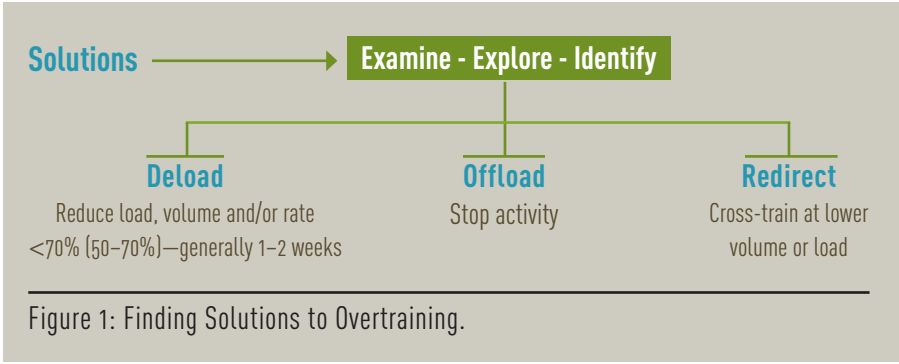


Figure 1: Finding Solutions to Overtraining.

THE SIGNS OF OVERTRAINING

Hans Seyle, the pioneering stress researcher, wrote that the "exhaustion phase" of his General Adaptation Syndrome increases the risk of injury or illness (Seyle 1978). That phase is synonymous with overtraining.

Though several signals point to overtraining, an elevated resting heart rate (RHR) coupled with a decrease in exercise performance over 7–10 days are perhaps the easiest to monitor (Pocari et al. 2015; NASM 2107).

By contrast, strength recovery is a consistent and effective marker of muscle recovery. Although objective markers of muscle recovery like creatine kinase (CK) are considered valid, the utility of CK is reduced by several variables including gender, age and individual biological responses.

Symptoms of overtraining include:

- Decreased performance over 7–10 day period
- Increased resting heart rate and/or blood pressure
- Decreased body weight
- Reduced appetite or loss of appetite and possibly some nausea
- Disturbed sleep patterns and inability to attain restful sleep
- Muscle soreness and general irritability
- Reduced motivation/adherence

If a client or athlete has symptoms of overtraining, you'll want to identify the causes and suggest solutions. As Figure 1 shows, solutions may include deloading (reducing training load and/or volume), offloading (ceasing exercise temporarily) or redirecting (changing activity) for a brief period (e.g., a few days to 1–2 weeks) or until the symptoms subside.

THE FUTURE OF RECOVERY

Technology to measure and encourage recovery is under development. For example, we'll soon be able to buy tracking devices for the central nervous system that show whether the sympathetic or parasympathetic system is dominant. Disposable or reusable cortisol-monitoring patches also are on the way. And a new assortment of strain gauges embedded within the fabric of shirts is already able to detect breathing rate, depth, ventilatory power and rate of chest dimension change—though these products are currently too expensive for much of the fitness community. In the future, when prices descend, their data may help everyday exercisers determine where they are on the stress-recovery continuum.

In addition, current research at the cellular level may one day be applied to the field of exercise recovery. For example, Japanese researcher and Nobel Prize winner Yoshinori Ohsumi has spent his career studying a concept of cellular recycling called *autophagy*, which explains how cellular components are degraded and recycled for use as fuel and building blocks. Although Ohsumi's current studies focus on finding medical treatments for disease, the notion of using his findings to expedite recovery after exercise-induced cellular damage is not farfetched. **AF**

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CEU QUIZ: EXERCISE RECOVERY

LEARNING OBJECTIVES: After reading the article, you should be able to:

- Describe the relationship between stress, recovery and homeostasis.
- Understand how to monitor recovery using various techniques and tools.
- Describe various methods for improving the recovery process.
- Discuss the scientific evidence for or against each method.

1. Which recovery technique BEST expedites lactate and hydrogen removal from muscle cells?
A. sleep
B. compression
C. active recovery
D. massage

2. Which form of recovery can we influence the most?
A. the recovery occurring between successive efforts (e.g., between repetitions within a set of biceps curls)
B. the recovery occurring between individual interval sprints (e.g. between two 40-yard sprints)
C. the recovery occurring between weight training sets
D. the recovery occurring between successive workouts or competitions (e.g., each daily workout)

3. Which physiological marker is believed to provide the MOST accurate assessment of one's general state of recovery from stress?
A. heart rate variability
B. maximal heart rate
C. recovery heart rate
D. heart rate discrepancy

4. Which of these terms represents the natural delay between one breath until the initiation of a subsequent breath?
A. control pause
B. automatic pause
C. systemic pause
D. ventilatory pause

5. Which of these terms is a stimulus that overcomes (or threatens to overcome) the body's ability to maintain its natural equilibrium?
A. homeostasis
B. stressor
C. allosteric load
D. overreaching

6. Research led to the discovery of _____, explaining a cell's capacity to degrade and recycle cellular components when it requires fuel or needs building blocks to survive.
A. innate immunity
B. autophagy
C. anabolism
D. catabolism

7. Why is it so important to monitor heart rate variability (HRV)?
A. Larger fluctuations in HRV mean the sympathetic nervous system is dominant, which is unhealthy.
B. Smaller fluctuations in HRV mean the sympathetic nervous system is dominant, which is healthy.
C. Larger fluctuations in HRV mean the parasympathetic nervous system is dominant, which is healthy.
D. Smaller fluctuations in HRV mean the parasympathetic nervous system is dominant, which is unhealthy.

8. What is the outcome if one generally overbreathes or even hyperventilates?
A. This forces greater amounts of carbon dioxide out from the lungs, resulting in a decrease in available bicarbonate in the blood and potentially decreasing one's capacity for high-intensity exercise.
B. This forces smaller amounts of carbon dioxide out from the lungs, resulting in a decrease in available bicarbonate in the blood and potentially increasing one's capacity for high-intensity exercise.
C. This forces greater amounts of oxygen out from the lungs, resulting in an increase in available bicarbonate in the blood and potentially decreasing one's capacity for high-intensity exercise.
D. This forces smaller amounts of oxygen out from the lungs, resulting in an increase in available bicarbonate in the blood and potentially increasing one's capacity for high-intensity exercise.

9. Decreased performance, reduced appetite and increased resting heart rate are typical of which physiological state?
A. functional overreaching
B. short-term adaptation
C. reversibility
D. overtraining

10. Which recovery method has demonstrated a slowing of normal regenerative inflammation and an increasing risk of further injury from extended exposure to cold temperatures?
A. cryotherapy
B. cold water immersion
C. contrast water therapy
D. hyperbaric oxygen

11. Which of the following statements is/are true?
A. Elastic compression clothing seems to reduce some muscle soreness and perception of fatigue.
B. Elastic compression clothing slows the removal of metabolic byproducts.
C. Pneumatic compression increases blood flow and decreases muscle stiffness.
D. All of the above are true.

12. In a study that compared cold water immersion therapy and contrast water immersion therapy, researchers found that:
A. CWI treatment demonstrated lower perceptions of muscle soreness and smaller decrements in muscle strength 24 and 48 hours post-exercise versus CWT.
B. CWT treatment demonstrated lower perceptions of muscle soreness and smaller decrements in muscle strength 24 and 48 hours post-exercise versus CWI.
C. CWI treatment changed heart rate and peripheral blood flow while CWT changed resistance to flow.
D. CWT treatment changed skin, muscle and core temperature while CWI influenced inflammation, immune function and muscle soreness.

13. What two vital data points do sleep and recovery depend upon?
A. insomnia and sleep debt
B. sleep debt and room temperature
C. sleep debt and basal sleep
D. restless leg syndrome and basal sleep

14. Which of the following are suggested approaches for clients or athletes who have symptoms of overtraining?
A. deloading, offloading or redirecting for a brief period until symptoms subside
B. reducing training load, ceasing exercise or changing activity for a brief period or until symptoms subside
C. both a and b
D. none of the above

15. Few reports demonstrate positive effects of which recovery strategy on repeated exercise performance?
A. sleep
B. massage
C. compression
D. cryotherapy

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King of the Beasts

Mike Fitch, creator of the Animal Flow® Workout, shares how his innovative programming can bring out the primal grace in your clients.

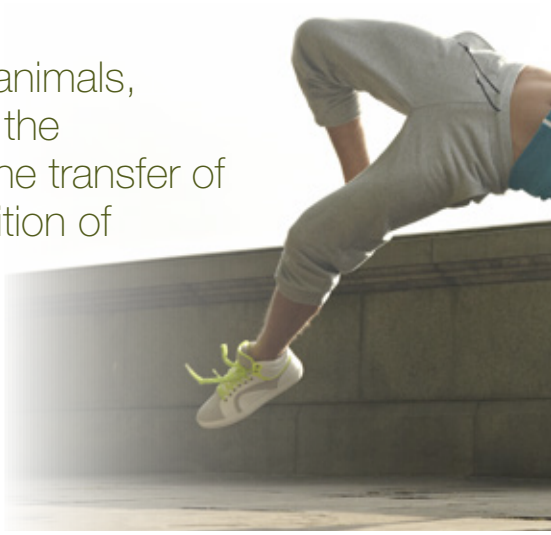
By Lucia Viti

Mike Fitch is a fitness phenomenon. Sporting an 18-year fitness resumé, this strength coach, personal trainer, post-rehabilitation specialist, and founder and president of Global Bodyweight Training has created multiple body-weight training programs and earned numerous certifications. But it's his latest creation—the Animal Flow® Workout—that offers fitness professionals a versatile format and unique exercise options worth howling about.

Touting the tag lines "Train Like A Real Beast" and "Train To Be Super," Animal Flow is rearing a new breed of athlete. The hybrid program fuses elements of body-weight training, skill-based disciplines (such as gymnastics and break dancing), quadrupedal (hands and feet on the floor) actions and ground-based movements that mimic animal locomotion. Animal Flow is designed to naturally challenge participants to gain strength by fighting gravity instead of lifting heavy weights. Tailored to all fitness levels, Fitch's unique, equipment-free program promises to increase mobility, flexibility, stability, power, endurance, skill and neuromuscular communication.

Photo by Soma Helmi

> When we move like animals, we can improve the communication, the transfer of energy and the cognition of the human animal.



Introduced in 2010, the program now boasts more than 2,000 Certified Animal Flow Instructors and 12 master instructors in more than 20 different countries. *American Fitness* caught up with the dynamo in between workshop certification travels that include Costa Rica, the United Kingdom, Dublin, Amsterdam, New Zealand, Indonesia, Australia, Spain and the United States. "We've gained an enormous amount of traction in a relatively short time, but our timing's on point," says Fitch. "Following the industry's phase of core and corrective exercises, fitness enthusiasts were ready for challenges out of the norm. With the help of my business partner, Karen Maher, Animal Flow has grown on a grassroots and organic level with momentum and pride. We've gathered a team of rock star instructors that people want to connect with. We're not a fad. We have legs and longevity. And the best part: Animal Flow is a solid, intuitive learning process that's super visual and fun." But to truly understand the beauty of this workout beast, let's begin at its beginning.

AN EVER-EVOLVING ANIMAL

Fitch, an avid athlete, was drawn to the fitness industry shortly after high school graduation. He had moved from Kentucky to Los Angeles, where he hired "an amazing personal trainer," who was so influential that Fitch thought, "I want to do what you do."

Shortly thereafter, Fitch began a lifelong foray into fitness education, obtaining various certifications. He moved again, this time to New York City to work as a trainer at Equinox Fitness Clubs.

"Exposed to the best minds in the industry, I became obsessed with seeking the finest coaches, training styles, modalities and philosophies," says Fitch. "I studied Olympic lifts; kettlebell training; sports-specific and speed agility training; and corrective exercise for pre- and post-rehab exercise clients." Never one to rest on his haunches, Fitch pushed onward, increasing his studies and sharing what he learned with others. "My education was self-study and hands-on," he says. "I became an educator, teaching anatomy, physiology, biomechanics and program design as a Master Trainer for the Equinox Fitness Training Institute."

For years, Fitch diligently employed traditional exercise programming to his clients and himself. His personal workouts, which focused on building muscle mass, were impressive. He gained 50 pounds by lifting considerable amounts of weight, but noted a cost to his health and well-being. "I'd wake up thinking, 'Wow I'm too young to feel this old,'" he says. "Although I was 'training to last'—that is, training today to be the person I want to be in 20 years—I felt beat up, rundown." His joints hurt, and in spite of his level of fitness, his body didn't move the way he wanted it to. "It just didn't jibe," he says. "So I put down the dumbbells and entered the world of body-weight training."

A WEIGHTY DECISION

Fitch immersed himself in the study of nontraditional exercise modalities. "I studied gymnastics, parkour, hand-balancing, circus arts, strength training and break dancing," he says. The experience was indeed humbling. Fitch realized that his focus on building strength had left him with little ability to put his body through various movement sequences. "Study became a journey of self-mastery to strategically build a functional, symmetrical and aesthetic physique with the tools I already had," he says.

Empowered by his new mission, Fitch searched for answers "not found in toys or machines but in skill sets." He instead performed "feats of balance and strength" —handstands, pushups, muscle-ups, the human flag—which intrigued and reshaped him both physically and mentally. "Body-weight training allowed me to achieve what weight-training never did," he asserts. Inspired, Fitch founded his company Global Bodyweight Training (GBT) which enabled him to further apply his accumulated knowledge of fitness and fitness management.

"As a fitness professional, personal trainer and educator, I created individualized programs that integrated fitness, nutrition and lifestyle coaching," Fitch explains. "I developed multiple programs that celebrated movement, embracing the philosophy that with practice and proper progression, everyone can excel at body-weight training." Fitch continued to improve and evolve, and he soon created the Animal Flow movement company within his already successful GBT business.

THE BEAUTY OF THE BEAST

Although Animal Flow sounds fluid and intuitive, it draws upon proven concepts of exercise science, kinesiology, and thousands of years of animal evolution. "Technically, movements that mimic animals translate as load variability that coordinate and sequence motion though multiple planes," explains Fitch. "Using high neuro-load sequencing, Animal Flow encourages postural and cognitive communication, postural repositioning and ultimately performance."

This is not an entirely new concept: Animal locomotive patterns are common themes among many fitness modalities.

Continued on page 42

Photo by Philip Haynes

Photo by Matthew Roy

6 Ways to Go With the Flow

Animal Flow® is a great addition to every fitness professional's arsenal of movement tools. Exercises are grouped into the six components listed below. Moves can be isolated or used in countless combinations within any exercise format, with each component eliciting specific unique results as explained below by the program's creator, Mike Fitch.

Wrist Mobilizations

These are simple wrist exercises designed to increase wrist flexibility and strength. Wrist health is described as the ability to adapt to consistent challenge. The "wrist-relief" position is noted as the go-to position between movements. Wrist mobilization exercises are suggested prior to and following each session.

Activations

By "setting the system," activations gather information, assess body stabilization, correct exercise strategy and serve as an antagonist movement to a resisted push or pull. Activations complement and link with the chains and slings of movement. Activations are also noted as a go-to tool for shoulder, spine and hip stabilization, as well as pre/post rehab and active rest.

Form Specific Stretches

These are full-body movements that explore range of motion, including flexion, extension, and internal and external rotation. Noted as an animal foundation, each of the Form Specific Stretches begin as an animal form. Stretches or "reaches" must be executed slowly and with control. End points can become an isometric/static movement for postural realignment and/or joint balancing, or they can be moved or released in multiple repetitions as active/dynamic movements for flexibility and conditioning.

Traveling Forms

Exercises that mimic animal movements—ape, beast, crab—are utilized for warm-up, body conditioning and active rest. Traveling Forms can be performed in opposing patterns—multiple planes of motion and direction—to sustain balance and reduce the potential for injury due to pattern overload. Traveling Forms are noted as tools to enhance communication between the shoulders and hips.

Switches (aka Transitions)

Switches and Transitions are terms used interchangeably to describe consecutive movements. These are the "flow" in Animal Flow. A seamless transfer of movement occurs from slow to moderate speed for fluidity. Switches and Transitions can stand alone as drills.

Flows

A combination of the entire program, Flows are various moves connected in a fluid sequence. Flows can be designed as choreographed sequences or performed as a callout routine. Conducted at random, callouts require skilled focus and reaction time.

BECOME AN ANIMAL TRAINER

Mike Fitch is offering intensive 2-day workshops in North America, Europe, Australia and Asia, providing fitness professionals with the opportunity to become certified as an Animal Flow Level 2 Instructor. The course will earn you continuing education credits: 0.7 CEUs from NASM, in particular. Learn more on www.animalflow.com.

Photos by Matthew Roy

Continued from page 38

"Building on my knowledge of anatomy and biomechanics, I spent hours and hours *and hours* on the floor testing ways to merge fitness modalities and disciplines to develop a sensible, structured, applicable and teachable program of quadrupedal crawling patterns that could improve the function of the human animal," Fitch says. "Animal Flow enables the body to translate energy with movements that connect to the ground and the reactive forces that go back into the body. Movements coordinate and create strategies not found in a gym scenario."

In short, Animal Flow underscores the idea that when we move like animals, we can improve the communication, the transfer of energy and the cognition of the human animal.

ANIMAL FLOW, DECONSTRUCTED

To fully understand Animal Flow, it's helpful to break it down into its most basic elements. *Animal* is just one component of Animal Flow. But in that one intriguing component, participants mimic animal movements to include an ape, a beast, a crab and a baboon, for example. "Animal movements are a fun and productive way of saying, 'Place your hands and feet on the floor and move in cool sequences not normally experienced on a daily basis,'" says Fitch.

Flow threads each modality of Animal Flow together by creating a seamless transfer of energy so that movements can be performed one after the other. "Animal traveling forms" link together as a continuous "flow" of switches and transitions at a slow or moderate speed. Switches and transitions can also be used as stand-alone drills. (See "6 Ways to Go With the Flow" for more details on flow and switches.)

Additional human modalities such as break dancing also play into Animal Flow. According to Fitch, break dancing is a great example of energy transfer, dissipation and redirection from ground contact, which embodies the very essence of Animal Flow. "Break dancers perform feats that 'break' the laws of gravity and physics and execute seemingly impossible movements by using force—the transfer of energy—efficiently and effectively," he says. Participants will also recognize other modalities in common Animal Flow moves: hand-balancing in static frogs, gymnastics in rolling patterns, parkour in traveling apes, and yoga movements in scorpion reaches.

Photos by Matthew Roy

Animal Flow serves as an "adhesive bridge among athletic modalities," says Fitch. "High-intensity weight-lifting programs can benefit from Animal Flow movements to increase flexibility, mobility and stability, while flexible yogis will benefit from tapping into more power, speed and fluidity as they move outside of yoga's strict plane of motion."

CHANNELING YOUR INNER ANIMAL

Animal Flow is a fun and interesting programming twist that can be integrated into everything fitness. Sequences can be maximized as a full-length group exercise class or integrated within small group training programs, boot camps, team and personal training sessions, as well as mixed martial arts.

Within a classroom setting, Animal Flow becomes a game of Simon Says. "Instructors choose random intuitive and flowing callouts. 'Take Static Crab... to left-leg Full Scorpion Jump...to right-leg Side Kick Through...to right-leg Under Switch...to Loaded Beast and left-leg Front Step,'" says Fitch.

The universal language of Animal Flow unites people of diverse backgrounds. "Directional words (right and left) and limb cues change to coincide with native languages, but movement words stay the same. Everyone speaks the same language to draw upon a cohesive opportunity of making Animal Flow friends globally."

The ever-increasing worldwide cache of Animal Flow instructors remains a testament to the program's global appeal. Not surprisingly, Fitch has even bigger aspirations for Animal Flow as a well-known fitness modality used in every fitness regimen including CrossFit, physical therapy, personal training and group exercise programming. "Animal Flow places students in an environment that allows them to learn how to navigate their body, which carries over to their experience of navigating their world," he adds.

Fitch also encourages students and instructors to use Animal Flow as a practice, not just a workout. "Like martial arts and yoga, Animal Flow requires repetition to perform movements fluidly and efficiently," he says. "And as in any repetitive practice, students can experience movement on a deeper, spiritual level. Movement is powerful and innate. There's really something god-like about the way we move. Animal Flow can be used as a vessel to reach into our psyche…and higher level of consciousness." **AF**

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DOUBLE-CHECK TRIATHLON TRAIN

Much has changed in endurance training during the four decades since the first triathlon. Ensure you are current on the new science to help clients enhance performance in a more time-efficient manner.

BY CHARLIE HOOLIHAN

The idea for the Ironman Triathlon started with a debate over "Who's more fit—runners, swimmers or cyclists?" Back in 1977, John Collins was a fitness enthusiast and U.S. Navy commander on active duty in Hawaii when he and a few friends got into that argument. Collins suggested settling the matter by combining three popular Hawaiian endurance events—cycling, open-water swimming and a marathon—into a triathlon. In 1978, 15 people competed in the first Ironman (Culp 2016).

As the Ironman's popularity grew in the years that followed, shorter and more accessible triathlons opened the sport to more recreational athletes. By 2015, more than 2.5 million people competed in triathlons, according to the Sports and Fitness Industry Association, representing a solid marketing niche for personal trainers (SFIA 2016).

The argument survives to this day, but one thing is certain: Triathlons require a lot of training, especially the kind personal trainers provide. A well-informed trainer understands the role of resistance training, core development, increased mobility and high-intensity cardiovascular interval training in endurance sports like triathlons. This article will briefly explore how such training has evolved over the past 40 years—and what today's fitness professional must know to help amateur endurance athletes enhance their performance in a manner that is both effective and as time-efficient as possible.

YOUR
ING KNOWLEDGE

Resistance training, plyometrics and HIIT all provide time-saving workouts for amateur athletes and fitness enthusiasts alike—but the high demands require proper management and execution. Staying current on exercise science is critical for trainers.

Dispelling the Mileage Myth

This is one of the first challenges a trainer may face when working with a new client who seeks to compete in a triathlon or other endurance sports. Though recommendations for gym-focused training techniques have been around since the running boom of the mid-'70s, endurance athletes generally have done most of their training on the road and in the pool. Indeed, 40 years ago, most elite endurance athletes were revered for their lengthy training protocols. Accolades poured in for elite runners' 120-mile weeks and Tour de France cyclists' 400- to 500-mile weeks. Professional triathletes trained 4–8 hours a day, and nationally ranked swim teams put in 18,000-meter training days for events between 50 and 1,500 meters.

Fortunately, today's amateur athletes and their potential trainers need not endure that kind of mileage. In fact, that's not only old-school, it's inefficient. Recent research and new coaching practices support the use of advanced fitness modalities that build strength and endurance with far less training time. These include resistance training, plyometrics and high-intensity interval training, all of which improve endurance factors such as work efficiency, VO_2max and performance improvements in specific events.

And all of these techniques require a trainer or coach for maximum benefit.

GET AN IRONMAN® TRAINING CERTIFICATION

The National Academy of Sports Medicine recently partnered with the Ironman Corporation to include its Ironman Coaching Certification.

The course helps trainers expand their training capabilities with triathlon-specific knowledge. Foundational content in exercise science, strength and conditioning, development of training plans and sports nutrition for endurance athletes are included, and most certified trainers and coaches should be familiar enough with them to get through the course easily.

More triathlon-specific content such as swimming, running and cycling biomechanics and technical aspects may expand a trainer's knowledge. The information will familiarize trainers who have minimal triathlon experience and help them develop ancillary programming such as resistance training and core and stabilization sessions for triathlon clients.

The online course is complete with videos, interviews with top triathlon coaches and interactive quizzes to test knowledge upon completion of each section of the course.

According to the Ironman website, the course takes approximately 14 hours to complete (1.4 CEUs) and costs $699.

Build Muscle, Boost Work Efficiency

Work efficiency—or work economy, running economy, cycling economy, etc.—is simply the amount of oxygen needed to perform a certain task. Including resistance training in your clients' program design can ensure stronger muscles and ligaments to provide more structural support, allowing athletes to use less oxygen during endurance events. Experiments with runners, cyclists, cross-country skiers and soccer players indicate significant improvements of 5–12% in work efficiency after basic 8-week strength-training protocols (Sunde 2010).

Subtract Distance, Add Plyometrics

Plyometrics—jumping and other explosive movements previously the domain of speed athletes—also improves running economy and lactate processing. A study *substituting* sprinter-style plyometrics sessions for 20% of distance-running volume found no falloff of distance event performance when compared with a running-only group (Mikkola et al. 2012). Enhancing your client's program design with plyometrics, while reducing their weekly distance, may also help reduce the risk of overtraining injuries and burnout.

Enhancing your clients' program design with plyometrics, while reducing their weekly running distance, may help reduce the risk of overtraining injuries.

Cut Training Time, Not Results, With HIIT

The contribution of high-intensity interval training (HIIT) to endurance has been investigated extensively, and it is fast becoming an important component of endurance training because of its time-efficient potential. Interval training sessions as short as 20 minutes, twice a week resulted in superior improvements in VO_2max compared with traditional endurance workloads 10 times longer. VO_2max quantifies the oxygen-to-muscle delivery system (Gibala & McGee 2008).

Why Amateur Athletes Need Fitness Professionals

Staying current on exercise science is critical for trainers, as it enables appropriate planning and successful integration of nontraditional workouts. For example, when using high-intensity intervals to train for endurance, research has determined the importance of paying attention to individual responses between standard high-volume, low-intensity training and low-volume, high-intensity training. No two people respond the same to similar training doses (Astorino & Schubert 2014; Gaskill et al. 1999).

Likewise, resistance training, plyometrics and HIIT all provide time-saving workouts for amateur athletes and fitness enthusiasts, as discussed—but the high demands require proper management and execution. This can present insurmountable challenges for many amateur athletes.

Case in point: Making the switch from traditional endurance training plans to one that incorporates HIIT requires care and knowledge. Traditional endurance training plans call for an 80:20 ratio of longer-but-lower-intensity training to shorter-but-higher-intensity-training. While time-consuming, this lower-intensity training makes fewer psychological demands and makes it easier for amateurs to avoid overtraining, injury and weakening of the immune system (Seiler & Tonnessen 2009). Altering these percentages with HIIT requires more planning and monitoring to evaluate responses to increased loads over shorter time durations. Again, this calls for a coach or trainer well-versed in planning daily, as well as weekly and monthly programming (known as periodization schedules).

Experiments with cyclists and other endurance athletes indicate significant improvements in work efficiency after basic 8-week strength-training protocols.

Monitoring responses to higher training intensities is critical to understanding when to reduce or increase load. Checking daily resting heart rate (RHR) and heart rate variability (HRV) along with periodic baseline fitness tests enables trainers to apply a more scientific approach to training plans (Hausswirth & Mujika 2013).

Examples of Programming in Action

Trainers with direct experience in endurance modalities can expand that know-how into sessions with more technical components. Being a former athlete with coaching experience is most helpful, but many successful coaches come into sports like triathlons later in life. Regardless of your personal experience in endurance sports, consider these types of programming when designing a training schedule for clients.

Diversify the Week's Workouts

A coach or trainer could offer a basic weekly schedule built around the athlete's individual workouts either separately or concurrently. Two coached workouts per week—one in body weight, core and balance training and one in resistance training—can be paired with an endurance session in running, swimming or cycling. Depending on the trainer's experience, one or two more technical sessions in swimming or running biomechanics paired with conditioning sets of varying intensities could be added.

These weekday sessions can be valuable lead-ups to an endurance athlete's longer efforts on weekends. This is especially important for time-challenged people with work and family commitments to balance. The workouts also can provide a more effective and more mentally stimulating 60- to 90-minute training day removed from the grind of roadwork.

Offer Group Training Opportunities

Coordinating group training rides, swimming sessions or track speed sessions for runners can be ways to expand an endurance coaching portfolio. These group sessions provide a greater opportunity for a coach or trainer with a busy schedule to maximize athlete participation. Starting group sessions can be as fundamental as setting aside 2–5 times per week to work on the aforementioned conditioning and technical aspects. The most logical participants in these types of programs would be triathlon beginners interested in getting more fit, or triathlon veterans who are trying to balance in work/life/training. Both populations can benefit greatly from more efficient time management through unique training approaches.

Don't Forget Recovery

Proper recovery techniques are critical to effective workout planning, especially with higher-intensity techniques. This presents opportunities for either one-time workshops or regular group sessions in myofascial release and stretching, combined with science-based education on home recovery modalities such as thermotherapy, compression and others. Here again, athletes need an educated coach or trainer to sift through the research on emerging techniques and summarize the findings on time-honored ones.

Lately we're seeing a lot of recovery techniques that have little or no scientific backing. This is another area where a good coach/trainer must stay current. For instance, there is little reliable research supporting emerging therapies like kineseotape, cupping or dry needling. Even standard recovery therapies like cold-water immersion and ice packs are being reassessed to figure out how to properly administer them and provide proper benefits (Kietrys et al. 2013; Parreira 2014).

Coordinating group sessions focused on running, swimming or cycling can provide a greater opportunity for a coach or trainer with a busy schedule to maximize athlete participation.

AT THE HEART OF TRI TRAINING

Advanced modalities for endurance athletes, such as those referenced in this article, generate a demand for more professional guidance from educated trainers. Basic certification protocols can provide a skill set to help improve endurance performance. Indeed, the NASM-CPT (certified personal trainer), with its comprehensive training protocols in myofascial release, flexibility and core-balance-plyometrics and multiplanar resistance training, gives trainers the essentials most endurance athletes need (NASM 2008). Specializations such as the NASM Performance Enhancement Specialization can provide additional tools for the trainer's toolkit, enabling further customization in program design.

About the NASM-PES

The NASM Performance Enhancement Specialization has been built to dovetail with the NASM-CPT, enabling trainers to maximize client workout efficiency, ensure safety and effectiveness of training, and reduce the risk of overtraining. Trainers in the PES program will learn to assess cardiorespiratory performance, as well as flexibility, speed and agility of both professional athletes and weekend warriors.

In Module 4, for instance, trainers will learn the proper criteria for conducting a 12 Minute Walk/Run Test to gauge cardiorespiratory fitness and how to use that information to create an appropriate cardio training plan. This module of the course also provides insights into a variety of cardiorespiratory training modalities and methods, including steady state and interval training. It will help the trainer progress clients through the four recommended training stages—aerobic endurance, anaerobic endurance, anaerobic power, and sport-specific training—and understand how to apply scientific concepts to a real-world training program. The NASM-PES Self-Study program is worth 2.2 CEUs ($699), and there's also a live workshop available. To learn more, visit www.nasm.org/PES.

Recent findings indicate "put some ice on it" may not be the panacea we once thought, as growing evidence indicates some of the body's natural healing properties are slowed if exposed to immediate cryotherapy. While the research is still somewhat unclear as to how to use ice for injury or recovery, this example shows the importance of staying current with research and practice (Stone 2015). To learn more about the science of recovery strategies and modalities, refer to the CEU Corner in this issue.

Putting It Together

Combining a credible personal training certification with practical and scientific advances can open new areas of training in the endurance population. Trainers with a passion for this area of fitness can enhance their skill set and develop new areas of practice. **AF**

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New Clients? Get to the Core of the Matter

BY KYLE STULL, DHSC, MS, LMT, NASM-CPT, CES, PES, CSCS

A strong, stable core is key to injury prevention and client retention. Here's the science behind core stabilization, along with moves to strengthen key muscle groups . . . and your clients' resolve to stick with your program.

As a new year dawns, thousands of people join health clubs with the intention of changing their lives. However, more than 40% of new exercisers cancel that membership within 4 months, and almost 70% terminate by the end of the first year (Nuviala et al. 2013). The most alarming aspect of this statistic is that it doesn't change from one year to the next. Do people simply give up…or is something else going on? To get to the root of the problem, we need to look at the body's core and how it relates to injury prevention.

INJURIES AMONG NEW EXERCISERS

Injury is one of the best predictors of failure in an exercise program. It's tough to stay focused and motivated when you're hurting. A study published in *Sports Medicine* found that between 60% and 90% of exercise programs begun by sedentary individuals ended in injury within the first 6 weeks (Jones, Cowan & Knapik 1994). There are many speculations as to why injury rates are so high among new exercisers. An idea put forth by Clark, Lucett & Sutton (NASM, 2012) is that these programs appear to focus on traditional resistance training. While there is nothing wrong with resistance training, many exercise machines provide external stabilization and neglect internal stabilization. When excessive load and repetitive movements are placed on an unstable foundation, something eventually breaks. James Edward Gordon, a founder of biomechanics, stated that compression structures fail due to a lack of stability, not strength (1987). To break the injury cycle for your clients—and maybe change the outcome of their resolutions this year—one of their first exercise goals should be this: building a solid, stable foundation. Here, we will look at the purpose of core stability, as well as exercises that can be done to assess stability and improve it in your clients.

STABILITY: DEFINED

Stability means different things to different professions. In physics, stability is when forces acting on an object are balanced. In aerodynamics, stability is the tendency for something to return to its original position after it has been disturbed. In human movement science, stability is the ability to resist unwanted movement and to return to the original position after being knocked out of balance.

All muscles have the ability to produce force, reduce force and stabilize joints. This occurs at all times, regardless of the movement. In a squat, for example, the knee is moving primarily in the sagittal plane while it is demonstrating stability in the frontal and transverse planes, and

A Solid Foundation for Trainers

Total-body improvement goals aren't only for clients with New Year's resolutions. For the past year, the National Academy of Sports Medicine has been updating, refining and, yes, improving upon our already valuable certified personal trainer program.

Today's NASM-CPT program continues to provide essential information for aspiring and existing fitness professionals, with educational programming that prepares them to change the lives of others. While integrating the latest scientific research into our existing model of evidence-based education, this updated program offers additional materials that enable aspiring fitness pros to apply the principles of human movement science to everyday work with various client types in a wide variety of modalities. Materials include real-world scenarios, easy-to-digest breakdowns of complex science, and repeated exposure to key concepts combined to make programming easier to apply to their business. Here is just one example of the applied science found in Module 9 of the NASM-CPT program.

ASSESSING A CLIENT'S CORE STABILITY

To develop the right program for a client, a fitness professional has to know how well the participant's body is moving and stabilizing. Assessments help guide exercise programs and shed light on mobility and stability issues. There are several methods of performing assessments or screens, but a quick and effective tool is the overhead squat assessment (OHSA). The OHSA offers a snapshot of movement—including mobility of the ankle, knee, hip and shoulder—along with stabilization. When performing the OHSA, the following may be indicators of poor stability:

- feet flattening
- knees caving in
- anterior pelvic tilt
- arms falling forward

Movement is complex, and these compensations may have other root causes, such as inflexibility. However, fitness professionals will find that using assessments such as the OHSA is a great starting place to begin designing a program for clients.

In the NASM-CPT program, trainers will learn how to adapt the OHSA to further identify the causes for compensations such as these. For instance, if the client does the OHSA while standing with their hands on their hips and their heels on a length of 2-by-4-inch wood, an arched lower back may indicate that core weakness is the primary issue (NASM 2017). Using information such as this, fitness professionals can use science and assessments to develop effective training programs that meet the training needs of various client types, including those who lack core stability.

As part of the 16 modules, fitness professionals will have access to online reading material, an exercise library, predesigned workouts, and concise videos including lectures, introductory concepts and exercise techniques. Users also can access case studies, learning activities, quizzes and a practice exam. To learn more about the NASM-CPT program, go to www.nasm.org/cpt.

the core muscles are stabilizing the spine and pelvis.

More specifically, *core* stability has been defined by Kibler, Press and Sciascia (2006) as the ability to control the position and motion of the trunk over the pelvis to allow optimal production of force and motion. Furthermore, Barr, Griggs and Cadby state, "It has become clear that stability is a dynamic process that includes both static positions and controlled movement" (2005).

THE MECHANICS OF CORE STABILIZATION

Core stability has been a subject of study and discussion since the 1970s (Barr, Griggs & Cadby 2005). Core stabilization works by the contraction of deep muscles, which include the transverse abdominis (TVA), internal oblique, lumbar multifidus, diaphragm and pelvic floor. This contraction results in an increase in tension of the fascia of the lower back, as well as an increase in intra-abdominal pressure (Hodges 1999). The tensioning of the fascia occurs because the TVA is oriented horizontally, resembling a corset. The diaphragm, pelvic floor, internal oblique and lumbar multifidus also contract in a coordinated fashion to increase internal pressure. When all these muscles are functioning optimally, they provide stability to each vertebra in the lumbar spine and stabilize the pelvis.

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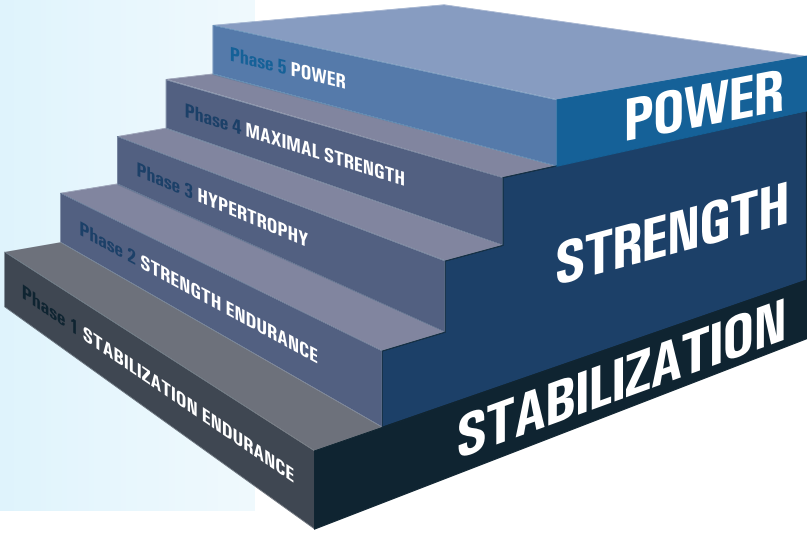


A common misconception regarding the core is that these muscles need to be "strong." To put it bluntly, stabilizers don't get strong because they are designed to be quick and demonstrate endurance. In fact, Barr et al. found that only a 10% maximal contraction was needed to properly stabilize the spine (2005). Further, research has concluded that the TVA should contract to provide stability *prior* to the movement of other muscle groups. Hodges, for instance, suggested that the TVA activates before the movement of an arm or leg (1999), and Cresswell, Oddsson and Thorstensson found that the TVA was activated prior to other muscles when a load was applied to the body, both when the load was expected and when it was not (1994).

Last, in a series of tests involving limb movement to determine *why* the TVA contracted first, Hodges found that the muscle was likely "preprogrammed" by the nervous system to do so (1999). Researchers came to this conclusion because contraction of the TVA occurred before the contraction of the muscle responsible for movement. Hodges concluded by suggesting the following about core stabilizers:

- Core stabilizers should be trained independently of other core muscles.
- Core stabilizers have the same function in all positions, thus training in supine or prone positions will translate to functional activities in other positions as well.
- The TVA may have to be retrained. If the TVA is not contracting before other muscles, then TVA-specific exercises should be included in a program.

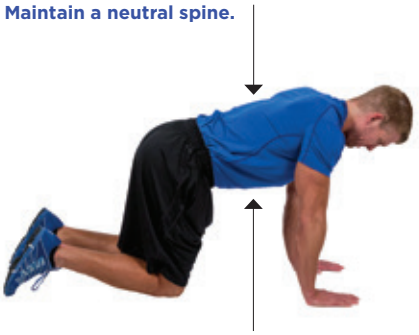
Ideally, core stabilizers should contract when needed without any conscious thought. However, in clients who are sedentary or are experiencing low back pain, these muscles may have to be taught to respond appropriately through core activation.

ACTIVATING THE CORE

Hodges and Richardson first demonstrated the role of the TVA in stability (1996). After this, the search for the best ways to activate the muscle began. With the TVA being very deep, it is challenging to directly measure how or when it contracts. Nonetheless, Aroski et al. soon discovered that drawing the navel toward the spine—also called the drawing-in maneuver, see below—appeared to best activate the "inner unit" (2001).

DRAWING-IN MANEUVER

Begin on the hands and knees with the back straight and the head in line with the spine. Pull the region just below the navel inward toward the spine while maintaining the cervical spine in a neutral position. (The action is similar to "sucking in" the stomach in when trying to button a pair of tight jeans.) This contracts the TVA bilaterally. Remind clients to breathe, rather than hold their breath, when performing this exercise. Hold for 15 seconds. Perform 10 repetitions. (NASM 2017)



More recently, Tae-Woo and Yong-Wook found this maneuver helpful for participants who demonstrated an excessive anterior pelvic tilt. By performing the drawing-in maneuver, such participants could increase gluteus maximus contraction while simultaneously decreasing the lumbar erector activity (2015). While this research does not suggest that everyone needs to draw-in, participants who demonstrate a lack of stability would likely benefit from actively engaging core stabilizers. The drawing-in maneuver can be done in any position, on its own or in concert with other exercises, including the core stabilization exercises that follow.

CORE STABILIZATION EXERCISES

Core stabilization is achieved by performing exercises that involve little to no movement in the spine. As the research above suggests, actively drawing-in prior to performing the exercise may improve activation. Remind clients to draw-in and to breathe (not hold their breath) during the following exercises. Last, it is imperative that the following exercises be executed with precision. Performing them incorrectly will set the stage for injuries.

Clients should perform the following exercises as part of a warm-up, after flexibility. This will help get the core activated and ready for additional training.

GLUTE BRIDGE

Begin on the back with the knees bent and feet flat on the floor. Draw-in the navel to the spine. Then drive through the feet to press the pelvis toward the sky. Press up until the hips are in a neutral position. The spine and pelvis should also remain neutral. Pause for 2 seconds and then slowly lower the hips to the floor. Perform 12–20 repetitions.

PRONE ISO-AB (PLANK)

Begin face-down with body weight supported only by the forearms and toes on the floor. Draw-in the navel, maintaining a neutral cervical spine, and keep head in line with body.

Clients should first learn to hold proper form for a short period of time (about 10 seconds). Have them perform 8–10 reps with a 3–4-second rest between reps. Slowly increase time and decrease reps, building up to 4 sets of about 30-second holds.

When a client can successfully do this, add in movements instead of additional time. A great drill to work on is lifting one foot. Lift foot high enough to extend the ankle, and hold for a few seconds. This

shift from a four-point to a three-point stance will cause an increase in activity in the core stabilizers. The client may also reach for an object using one arm, keeping both toes on the floor, or they can decrease stability by leaning both forearms on a stability ball.

OPPOSITE ARM-LEG REACH

This exercise is designed to teach clients to perform a contralateral movement pattern with a neutral spine. Begin by performing the drawing-in maneuver, then reach one arm forward and the opposite leg back. The goal is not to reach high, but far. Tell the client to think of making yourself longer, reaching toward the opposite walls. Perform 12–20 reps, alternating sides.

DEAD BUG

This exercise also teaches the client to stabilize the spine and pelvis while performing a contralateral movement. This may not be for beginners, as the client needs at least foundational levels of stability.

Begin by laying supine with the arms straight up. Bring the legs up, with the hips and knees bent to 90 degrees. Draw-in, then slowly reach one arm overhead and the opposite leg out without allowing the pelvis or spine to move. If the client begins to feel this in their lower back or describes it as really "getting their lower abs," then they are using too much psoas, and they need to regress by decreasing motion or substituting a different exercise. Perform 12–20 reps, alternating sides.

NEXT STEPS AFTER CORE WORK

After performing core stabilization training, have the client perform a single-leg balance exercise followed by reactive training. One great reactive exercise to have a client perform after stabilization is a simple squat jump to stabilization. This involves a small jump followed by a soft landing, which the client holds for 3–5 seconds. This exercise teaches the client how to properly decelerate with a stable core. In addition, this integrates the new core activity into functional activities. Then move into resistance training using exercises that encourage the client to stabilize themselves. For example, instead of doing a seated chest press, have them perform a standing cable press. By standing, the client will be forced to engage their stabilizers, leading to even better core and hip stabilization.

The first 4–6 weeks of exercise should utilize core stabilizer exercises; this is Phase 1 of NASM's Optimum Performance Training (OPT™) model, Stabilization Endurance. Periodically remeasure with the overhead squat assessment (OHSA). If the assessment isn't improving, then you may need to consider the exercises. If the assessment is getting better, then you know you're on the right track, and after several weeks the client will be ready to move to the next phase! **AF**

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What Are the AFAA 5 Questions™ and Why Do They Matter?

Consider these queries a required mental warm-up when designing or updating your workout programs.

BY LAURA A. GLADWIN, MS

One of the most important responsibilities of the group exercise instructor is to perform the proper "standard of care" in our delivery of services (Herbert, 2010). In fact, using "pre-activity screening devices" can help fitness professionals reduce their exposure to legal liabilities (Herbert 2016). For group exercise instruction, class participants bring a variety of fitness levels, unique characteristics and personal goals. These variables can substantiate the need for a more conservative approach when creating program designs—focusing on the risk-to-benefit factor for each exercise. In other words, prior to implementation of each exercise in a group program, you should assess three major areas: safety, effectiveness and appropriateness.

An excellent evaluation tool that has withstood the test of time is the AFAA 5 Questions™. This instructional tool was created in the late 1980s when AFAA entered the global market. At that time, it became imperative for AFAA certification specialists to be able to connect—in a clear and concise manner—with participants who came from a variety of cultures and spoke different languages. According to Master Trainer and former AFAA board member Linda Shelton, the questions provided an easy-to-understand method for specialists to encourage attendees in their classes to determine on their own whether a particular exercise was considered safe, effective and appropriate for their own use. They can also be used to help the fitness professional create modifications for those participants who need them. (See "Modify Like a Pro" in this issue for additional guidance about adapting exercises appropriately.) The questions are as follows (AFAA 2010).

The AFAA 5 Questions

1. What is the purpose of the exercise?

Consider: muscular strength or endurance, cardiorespiratory conditioning, flexibility, warm-up or activity preparation, skill development and stress reduction

2. Are you doing that effectively?

Consider: proper range, speed and body position against gravity

3. Does the exercise create any safety concerns?

Consider: potential stress areas (e.g., lower back, knees, wrists, neck), environmental concerns or movement control

4. Can you maintain proper alignment and form for the duration of the exercise?

Consider: form, alignment and stabilization

5. For whom is the exercise appropriate or inappropriate?

Consider: risk-to-benefit ratio; whether the participant is at a beginner, intermediate or advanced level of fitness; and any limitations reported by the participant

ASKED AND ANSWERED

So how do fitness professionals apply the AFAA 5 Questions? Let's take a look at three types of exercises as examples.

5 Q's & the Quadruped

This exercise is used in both a group setting and in personal training to work on core stabilization and promote balance. As one refers to the AFAA 5 Questions, the quadruped passes questions 1 and 2 with flying colors, but can it pass 3, 4 and 5? That depends upon the participant. Those who would benefit from a different exercise choice include participants with knee or wrist problems, weak core muscles causing loss of form, and/or difficulty effectively modifying the exercise. An effective modification might be to use a stability ball that is appropriately sized and placed under the torso so as to maintain the upper body in a parallel position in relation to the floor. This may allow some participants to achieve the goal of the exercise.

5 Q's & the Grapevine

The grapevine is a common exercise used in a variety of low-impact cardio fitness classes. This exercise certainly passes ques-

Who's Asking?

The AFAA 5 Questions were developed in the 1980s, but they're every bit as relevant today. Who is using them? The following are testimonials from renowned fitness professionals representing both group fitness instructors and personal trainers.

"The AFAA 5 Questions make complex exercise science and evaluation principles user-friendly. It has always amazed me that one simple tool could cover so much so eloquently. In many cases this AFAA tool, along with the exercise continuum, allows certified group instructors and personal trainers to broaden and clarify the way they approach old and new exercise trends."

–Kathy Stevens, Educational Director for the Evolution Fitness Conference at The FitExpo

"The AFAA 5 Questions changed my professional and personal life when I met them 20 years ago. In five steps, these questions teach anyone how to evaluate a purpose, thought, mission, or action, and give tools to everyone to answer questions intelligently. These questions have gotten me out of tight spots during my career. I will carry them—in some evolved way—in my heart, with every interaction, with every client and company."

–Lawrence Biscontini, MA, AFAA Certification Specialist, and creator of the new YouTube versions of the AFAA 5 Questions

"Back in the '90s, I served as an expert witness in a lawsuit against a celebrity, a trainer and a cosmetic company who produced an exercise video for consumers. I taught the AFAA 5 Questions to the jury and used them to make a case against inappropriate exercises presented within the video. [The AFAA 5 Questions] have been invaluable in my fitness career, and I've surely used them thousands of times. This evaluation tool has been in all three editions of the textbook I co-authored with Carol Kennedy-Armbruster (*Methods of Group Exercise Instruction*). This text is currently used at over 80 universities in the U.S. and is a best-seller around the world. [The AFAA 5 Questions] constitute a powerful tool for exercise analysis—the best tool I've seen."

–Mary Yoke, co-author Methods of Group Exercise Instruction *(Human Kinetics 2014)*

Strengthen Your Safety Muscles

The AFAA 5 Questions are so important to exercise safety that they're highlighted in Part 1 of the 4-part AFAA Essential Injury Prevention series of courses. As a fitness professional, you know that a healthy, injury-free participant is a happy and *participating* participant. When your class members are injured, it hurts not only them but your business and potentially your reputation. That's why this bundle of programs is worth far more than the 16 CEUs you'll earn upon completion. By providing you with the tools to assess individuals' movement patterns, identify common imbalances and create appropriate modifications, this series will help you provide a more personalized approach to your group exercise class members.

AFAA Essential Injury Prevention (Bundle): Course Description

These classes are based in the science of human movement, including functional anatomy and biomechanics, particularly as they relate to injury prevention. By having a strong understanding of these principles, group instructors can create outcome-based classes that will provide a better movement experience for their participants as well as themselves. Instructors will learn to assess clients' injuries and imbalances so they can provide appropriate modifications, all of which may help class members avoid new injuries and aggravation of existing problems and rehab after injury or surgery.

- Learn more about classifications and terminology of injuries, including stages of inflammation and repair.
- Identify common movement system impairments and misalignments in the upper and lower body, as well as the spine, and basic injury prevention strategies.
- Understand how to make minor adjustments to the flow and progression of your class for participants with impairments.
- Discover specific recommendations for the most common group formats—cycle, resistance/strength training, cardio/HIIT, boot camp, dance, aqua and mind-body—as well as how to adapt what you've learned to a different modality.

Learn more:
www.afaa.com/courses/essential-injury-prevention-bundle

tion 1 and, if appropriate speed is used, it potentially passes question 2. However, when it comes to questions 3 and 4, there is a need to pause and evaluate. In a group fitness class, would the grapevine, with its cross-behind step during execution, be appropriate for an individual whose balance may be compromised by a knee injury, a recent hip replacement, or an ankle injury? Can this exercise be modified (question 5) to accommodate this participant? Yes, by changing the cross-behind to a step-together, it can pass questions 3 and 4. By providing a modification cue before demonstrating the grapevine, the group instructor will allow participants to continue exercising effectively and safely while the other class participants execute the grapevine move.

5 Q's & High-Intensity Interval Training (HIIT)

How would the newest workout trend, based on the Tabata method, stand up to the AFAA 5 Questions? According to Kathy Stevens, educational director for the Evolution Fitness Conference at The FitExpo, some movements would not pass numbers 3 and 4 for certain participants. "But then again, there will be athletic participants that will find those moves exactly what they need to serve the purpose of questions 1 and 2," she says. "Thus, the beauty of the AFAA 5 Questions is in its ability to quickly reinforce what we intuitively know but sometimes overlook."

FUNDAMENTALS THAT STAND THE TEST OF TIME

Three decades after they were created, the AFAA 5 Questions are still being used by fitness professionals around the world. This valuable evaluation tool has assisted both group exercise instructors and personal trainers during their creation of program designs. It has helped to ensure that the risk-to-benefit factor has been analyzed prior to conducting a class or one-on-one training session. By implementing the AFAA 5 Questions as part of the initial steps in program design development, fitness professionals can demonstrate that proper care has been taken to ensure safety, effectiveness and appropriateness when working with their clients. **AF**

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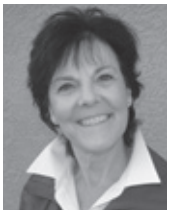

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Introducing AFAA's NEW Sustaining Mobility and Movement Series – Human Movement Science

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4 Food Myths That Science Debunks

MATTHEW KADEY, MS, RD

It's time to let go of these cherished nutritional notions.

Americans need to rethink some of their long-held beliefs about the best healthy-eating habits. After all, something's clearly amiss with these beliefs. Take, for example, a humbling recent report published by the U.S. Centers for Disease Control and Prevention which said that the average weight of American women and men has increased by about 16 and 15 pounds, respectively, over the past two decades (Fryar 2016). Our heights stayed about the same, so it's an easy guess where all those pounds went.

For many people, eating for weight control and disease prevention is hard enough without needing to sort through all the dietary truths and falsehoods floating around the internet, gym floors and diet books. That's why it's best to turn to the *real* research to set the record straight on some of the biggest eating misconceptions of our time.

Let's take a look at four enduring food myths:

MYTH 1: FREQUENT EATING IS BEST

In all the banter about weight loss, there's a lot of talk about eating smaller amounts of food throughout the day instead of relying solely on three larger meals. The belief is that noshing between meals will keep your fat-burning metabolism revved up, subduing hunger and putting a halt to overeating come mealtime.

Could this be why America has become a nation of snackers? If so, there's a problem: Recent research suggests such an eating strategy might be hurting, not helping, in the battle of the bulge. For example, a *Journal of the American Dietetic Association* study reported that subjects who didn't snack between breakfast and lunch lost nearly 5% more weight over a 12-month period than did morning snack eaters (Kong et al. 2011). Often breakfast and lunch are just a few hours apart, so morning snacking is likely fueled out of habit (or being told it's a healthy dieting strategy) rather than hunger or a genuine need for nutrition.

Another study of nearly 17,000 people determined that those with the highest meal and snack frequency were more likely to be overweight (Murakami et al. 2015). What's more, a 2016 *Journal of Nutrition* study determined that people who consumed food on eight separate occasions during the day did not experience any less hunger than when they consumed the same number of calories during three eating occasions (Perrique et al. 2016). It boils down to this: The more times we eat during the day, the more chance we have to mindlessly eat too much. It's much harder to keep tabs on overall calorie intake when you're constantly stuffing something into your mouth.

FIGHT BACK: We should ignore the notion that frequent eating leads to a slimmer waistline. It's all about what works best for each person. If someone finds that eating at regular intervals keeps their energy levels up and prevents hunger-induced fridge raids, they can keep doing so as long as they don't overdo it. But people who are satisfied with enjoying three square meals a day should not be discouraged from this eating style. It could very well be the answer to helping beat unwanted weight gain.

MYTH 2: YOU CAN EAT WHAT YOU WANT IN MODERATION

One of the most pervasive bits of dieting advice is to eat "everything in moderation." On paper it makes intuitive sense: You can eat pizza and ice cream and not suffer waistline repercussions if you do so in small amounts. But according to a 2016 University of Georgia study, many people have a skewed sense of what "moderation" actually means (vanDellen et al. 2016). The majority of subjects in the investigation defined a "moderate" serving of an unhealthy food like cookies as being actually larger than what they thought they "should" eat. For example, volunteers on average guessed they should eat only two cookies at once—but eating three cookies would qualify as eating them in moderation. (About six cookies was considered an "indulgent" amount).

With respect to gummy candies, participants thought eight was how much someone should eat, but 11 constituted a moderate intake. The researchers also found that the more someone liked a certain so-called junk food, the more generous they were with their definition of a moderate serving size.

More proof that the notion of "eating everything in moderation" is not in most people's best interest: A recent study published in the journal *PLOS ONE,* which showed that people who tend to eat a little bit of everything were more likely to gain belly fat (Otto 2015). A few fries here and a handful of chips there can add up to packing on the pounds. The upshot is that people are likely to misinterpret the vague concept of eating vice foods in moderation and use it as a license to eat what they want.

FIGHT BACK: An overly strict diet is rarely the best one—place certain foods off-limits, and you're likely to crave them even more. But practicing "all things in moderation" is just as likely to lead to diet meltdown because it can be molded any which way. So people should forget the mental gymnastics and instead set quantifiable goals to avoid dietary cheating. A useful eating plan clearly defines what moderation really means.

A good start is assigning a specific guideline that only 10% of someone's total daily calories should come from foods like ice cream that are far from nutritional saints. Or if someone has a daily chip habit, they can be instructed to measure out 1 cup for a truly moderate serving. This allows for some dietary flexibility, which can help keep people on track, but also places some concrete guidelines.

MYTH 3: EAT MORE FRUITS AND VEGGIES AND WATCH THE WEIGHT FALL OFF

Infusing your diet with servings of fruits and vegetables is fine for overall health, but it won't melt pounds away, according to a review of studies in *The American Journal of Clinical Nutrition* (Kaiser et al. 2014). The authors determined that without some sort of compensatory reduction in total calorie intake—which often gets overlooked—ramping up fruit and vegetable intake is unlikely to trigger weight loss. So you can eat all the tomatoes and bananas you want, but without trimming calories from other parts of your diet, the chances of fat loss success are slim, so to speak.

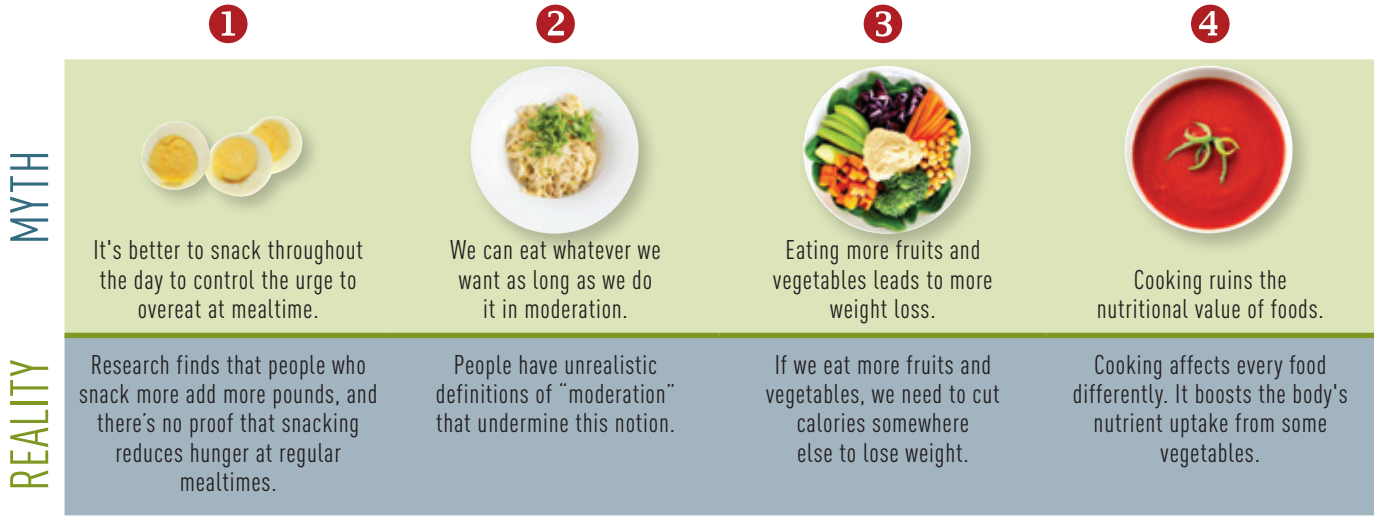
It should be noted, however, that the study did not show that eating extra fruit and vegetables contributes to weight gain. High intakes of calorie-laden packaged, processed and restaurant foods are more likely culprits.

FIGHT BACK: This research is just more proof that weight loss is a complex issue that requires more than simply implementing one dietary tweak for long-term success. Overall eating and fitness patterns need to be taken into account, which includes determining if somebody is eating more total calories than necessary—which can also include calories from fruits and vegetables.

MYTH 4: COOKING DESTROYS NUTRIENTS

In the name of eating a more nutrient-dense diet, many people assume they should stuff themselves on raw salads. The theory goes that cooking certain foods, namely fruits and vegetables, will lay waste to their nutritional bounty. But modern science shows that it's not always necessary to work your way through a bowl of raw kale.

4 Enduring Food Myths (and Realities)



A 2016 study in the journal *Food Chemistry* discovered that steaming actually increased the antioxidant activity of kale, whereas stir-frying had the same benefit on red cabbage (Murador et al. 2016a). Some heat may actually release certain antioxidants from their bonds that would have prevented your body from being able to digest them if you had eaten the vegetable raw. Further, Spanish researchers determined that vegetables such as eggplant and pumpkin contain more antioxidant firepower when fried or sautéed in olive oil compared to when consumed raw or after boiling (Ramírez-Anayaa et al. 2015).

One investigation found that cooking blueberries does not significantly degrade their nutritional value (Murphy et al. 2009). And when tomatoes feel the heat, they can serve you better. The process of heating tomatoes (think pasta sauce) opens up their cell walls, which allows us improved access to the health-hiking antioxidant lycopene (Allen et al. 2003; Shi & le Maguer 2000).

FIGHT BACK: If cooking vegetables and fruits helps people eat more of them, then that is a smart plan of attack and won't necessarily result in a serious nutritional compromise. It's very likely that choosing to sometimes eat items cooked and sometimes raw can maximize the nutrition derived from the very same food.

Every fruit and vegetable likely varies in how it reacts to cooking methods, but as a general rule, it's best to keep cooking time, temperature and the amount of liquid used to a minimum. That's why studies show steaming on the stovetop or in the microwave is one of the best ways to cook most vegetables for nutrient and antioxidant preservation (Murador et al. 2016b; Xu et al. 2014). On the flip side, boiling can result in significant leaching out of water-soluble nutrients like vitamin C and folate (Andlauer et al. 2003; Jiménez-Monreal et al. 2009). **AF**

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BY ALEXANDRA WILLIAMS, MA

Not-So-Sweet Hearts

A brief history of the sugar industry and coronary heart disease

How many licks does it take to get to the center of a food conspiracy? One? Two? Three? In reality, it took plenty of research and thorough review of historical documents by some determined sleuths.

A September 2016 article in *JAMA Internal Medicine* reports the results of a University of California, San Francisco study: that the Sugar Research Foundation "sponsored a research program in the 1960s and 1970s that successfully cast doubt about the hazards of sucrose while promoting fat as the dietary culprit in coronary heart disease." Researchers led by Cristin Kearns reached this conclusion after examining SRF internal documents, historical reports and statements "relevant to early debates about the dietary causes of CHD." They then assembled the findings into a narrative case study, which allowed them to do a detailed historical analysis.

In 1954 Henry Hass, then-president of SRF, delivered a speech that laid out an opportunity to gain market share by convincing Americans to eat a lower-fat diet. This may have served as the inspiration for the sugar industry, which went on to spend $600,000 to teach people "that sugar is what keeps every human being alive and with energy to face our daily problems." By 1962, research was suggesting that a low-fat diet high in sugar could elevate serum cholesterol level. To counter this, the SRF began funding studies (e.g., in the *New England Journal of Medicine*) supporting the position that "the only dietary intervention required to prevent CHD was to reduce dietary cholesterol and substitute polyunsaturated fat for saturated fat in the American diet," while also challenging studies that offered a different perspective.

While industry and nonindustry funding was disclosed, the SRF's funding and participation was not, as that was not required in the 1960s. It wasn't until 1984 that the *New England Journal of Medicine* instituted a policy of disclosing conflicts of interest. To this day, the SRF (now known as The Sugar Association) denies any link between added sugar consumption and cardiovascular disease risk.

Regardless of what was said in the past...the American Heart Association recommends limiting intake to 6 teaspoons or less per day, and the new Nutrition Facts food labels will be listing the amount of added sugars, which can help clients and trainers keep tabs on their intake.

The February 2017 issue of *Food Chemistry* will discuss research in Germany and India that analyzed the nutritional value of duckweed for human consumption. The study's authors discovered that "owing to the amino acid composition, the total protein of duckweeds qualifies as a high-quality protein source for human nutrition."

An aquatic plant that doubles its biomass in 24–36 hours, duckweed goes from seed to full harvest in less than 3 weeks, making it an easily accessible source of nutrition for millions of people. Six duckweed species were analyzed, and their amino acid distributions were found to be comparable to those of other plant proteins recommended by the World Health Organization. Of those six, two were pronounced most desirable for human consumption due to their high growth rates: *Wolffia microscopica* and *W. hyalina.* Average protein content for the six species ranges from 20% to 30% per dry weight.

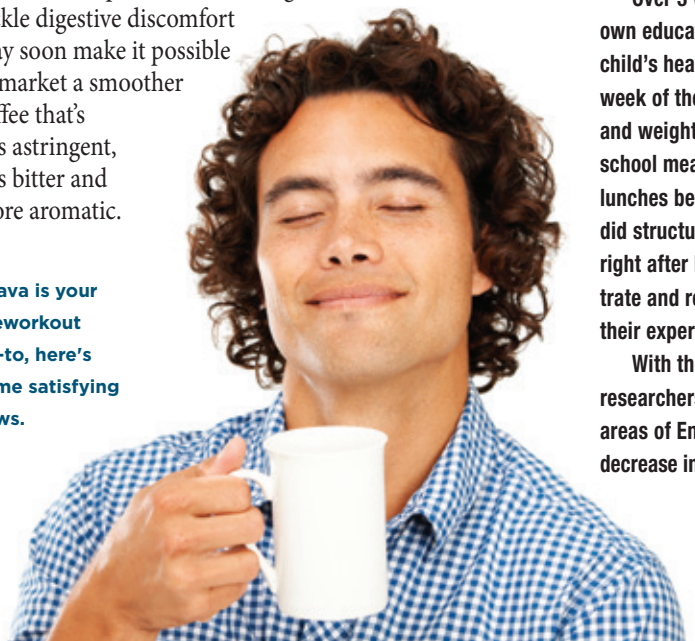
Only a few companies are developing food products based on duckweed protein, though they are prepared to quickly ramp up production. The main issue will be whether this unusual protein source will be widely accepted outside of Southeast Asia.

SWEET SCIENCE:

Taking the Edge Off Coffee

"Cultured" coffee may soon be here—referring, of course, to microbes rather than something from an English 19th-century social gathering. First-generation fermented foods such as beer and sauerkraut (see the Sauerkraut with Fennel recipe) have been around for thousands of years, while second-generation options such as artificial sweeteners and animal-free dairy proteins are fairly new. (Aspartame comes from fermented corn and soy, while animal-free milk is created with yeast, plant nutrients and cow DNA.)

Now a third wave may be on the way as scientists research ways to remove the bitter notes in coffee. Eliminating certain microbes during a controlled fermentation process and adding other microbes that tackle digestive discomfort may soon make it possible to market a smoother coffee that's less astringent, less bitter and more aromatic.



If java is your preworkout go-to, here's some satisfying news.

Nordic Countries Look for Link Between School Lunches and Learning

With an eye to developing school lunches that benefit pupils' classroom learning behavior, researchers in Sweden, Finland, Norway and Iceland have begun a cross-sectional, multidisciplinary study of over 800 students born in 2003 (*Food & Nutrition Research*, August 2016), titled "ProMeal - Prospects for promoting health and performance by school meals in Nordic countries." Noting that the Nordic countries are a "global health lab" due to their many similarities in culture, dietary habits and diet-related diseases, the authors want to help guide school lunch policy in the hopes of adding data to the fairly limited research available on the subject.

Over 3 weeks, parents/caregivers filled out questionnaires that covered their own education, occupations, ethnicity and family constellation, as well as their child's health, physical activity and diseases or health conditions. In the first week of the study, during school hours, the students were measured for height and weight, given cognitive tests and asked to write empathy-based stories about school meal situations. In week two, the children took photographs of their school lunches before and after eating—almost 4,000 images total. The researchers also did structured observations of learning-related classroom behavior in the lesson right after lunch. Some students also took a test to measure their ability to concentrate and remain focused. In week three, children were put into groups to discuss their experiences and beliefs about school meals.

With the large number of children participating and a low dropout rate, the researchers hope to expand upon what was learned during a previous study in poor areas of England. There, once school lunches were improved, students showed a decrease in absenteeism, as well as substantial improvement in literacy and science.

Beliefs About Meat Origins Influence the Eating Experience

The mind has a powerful influence on our senses, at least when it comes to meat eating. An August 2016 *PLOS ONE* article shared the results of three studies that tested whether beliefs about how animals are raised would influence people's experience of eating meat—specifically, roast beef. In the studies, identical samples of meat were paired with descriptions noting that the animal came from a factory farm, from a humane farm or from a store (with no indication as to the farm conditions) or had no description at all.

The results will probably not surprise those who eschew meat eating. In all three studies, participants rated eating the meat as a less pleasant experience overall if they thought the meat came from a factory farm, finding that it smelled, tasted and looked less pleasant than if it came from a humane farm. They also ate smaller portions of the proffered samples. In addition, the tasters were willing to pay for the meat only if it cost less, and they reported being less likely to eat factory-farmed meat again.

Notably, negative beliefs (factory-farmed meat) reduced people's enjoyment, yet positive beliefs (humane farms) did not increase enjoyment. In other words, when paired with the control description (listing only the store where the meat was sold) or no description, the humanely farmed description did not increase people's enjoyment of the roast beef. Conversely, when people believed the animals had been raised in "small cages," their enjoyment decreased.

This finding differs from the results of similar tests using labels such as "fair trade" and "local," in which the pleasantness was increased when these labels were used, leading the researchers to wonder if affective responses to perceived animal suffering are likely to be more powerful than affective responses to nonanimal products such as chocolate, coffee or juice. This dichotomy will have implications for marketing and future research.

The study authors concluded that "experience is not determined solely by physical properties of the external world—experience is also shaped by beliefs."

Lower Risk of Depression in Women Who Regularly Eat High-Fat Yogurt

A longitudinal study looking for a link between depression and consumption of yogurt and prebiotics was published in the September 2016 issue of *The Journal of Nutrition*. Using a Mediterranean cohort, researchers set out to discover whether a diet that includes prebiotics and yogurt would decrease the risk for depression.

Participants were obtained via the SUN (Seguimiento Universidad de Navarra) Project. Using data from 14,539 male and female Spanish university graduates who were initially free of depression (mean age 37 years), the study authors flagged participants' intake of full-fat yogurt, low-fat yogurt and prebiotic fiber.

At baseline and after a 9.3-year follow-up, the study participants filled out validated food frequency questionnaires, which were then used to assess prebiotic (fructans and galacto-oligosaccharide) intake and yogurt consumption (<0.5, ≥0.5 to <3, ≥3 to <7, and ≥7 servings/week). During follow-up, 727 cases of depression were identified, based on a previously validated clinical diagnosis of depression given by a physician.

Based on the diagnoses and the food questionnaires, the authors found whole-fat yogurt intake to be associated with reduced depression risk. Study participants who ate 7 or more servings per week were 22% less likely to be depressed than those who ate less than half a serving weekly. Interestingly, and definitely a basis for further research, this association was significant only in women. Also of note was the finding that consuming low-fat yogurt was associated with a *higher* incidence of depression during the first 2 years of the study, but not after the full follow-up, perhaps due to reverse-causation bias. Prebiotic consumption did not show a significant association with risk of depression.

RECIPE: *Sauerkraut with Fennel*

Stephanie Weaver, MPH, has been renovating recipes for over 30 years, and sharing them on her blog, RecipeRenovator.com, since 2010. As she learned more about the health benefits of raw foods, she grew adventurous about trying new foods, especially those high in probiotics (live microorganisms in food that confer a health benefit on the host). The bacteria in fermented foods such as sauerkraut and pickles are considered probiotics.

Weaver likes this recipe for sauerkraut because it requires few ingredients and is fairly easy to make. "It's crispy, with a pleasantly sour taste. I like adding vegetables such as beets, carrots and fennel," she says. She cautions cooks not to confuse sauerkraut with cooked cabbage, which she "detests."

One head cabbage, green or red
3–4 large carrots
1 bulb fennel
1 Tbsp sea salt or kosher salt
Slow-cooker liner or food-grade plastic bucket
Flat-bottomed cup to mash down the vegetables in the pot
Plate that fits inside the pot
Clean rock or water-filled jug (to weigh down the vegetables)

Wash the vegetables. Remove any wilted outer leaves from the cabbage, then cut it in quarters and remove the hard core. Using a sharp knife or a food processor fitted with a shredder disk, shred or finely slice the cabbage. Shred or grate the carrots. Remove any hard stems from the fennel, then finely chop.

Set a large bowl on the counter with the salt next to it. As you shred the veggies, add them to the bowl. Sprinkle each layer lightly with salt. (You can make this without salt, although it will not be as crisp.)

When all the vegetables are prepared, mix everything together thoroughly. The salt draws the water out of the vegetables and creates a natural brine.

Pack the slow-cooker liner or bucket, using the flat-bottomed cup to mash each layer flat, removing any air. Once you have all the vegetables in there, put the plate on top and press down. You should already have a fair bit of brine. Add the weight. Press again.

Ensure that the liquid rises above the level of the plate so the vegetables are not in contact with air (otherwise you will get mold, not fermentation). If there is not enough liquid, add a bit more. Fermentation usually happens within a few hours. If it hasn't happened overnight, then make 1 cup of salt water by mixing 1 Tbsp of salt with 1 C of filtered water and pour it in.

Put a clean kitchen towel over the slow-cooker liner or bucket and place it in a cool, dark place. Check it after 3 or 4 days, and skim off any foam that has formed, washing the weight, then replacing it. Taste the sauerkraut after 5 days. Once it's ready, remove it to a container and store it in the refrigerator.

Makes 16 servings. Prep time: 15 minutes. Wait time: 5–7 days.

Italy Updates Laws to Limit Food Waste

Estimating that it costs the Italian economy more than $13.3 billion annually (about 1% of gross domestic product), Italian senators passed new laws in August 2016 aimed at reducing food waste.

The goal is to cut a million tons from the estimated 5.1 million tons of food wasted each year. The government plans to update laws that once required restaurants and supermarkets to declare any food donations 5 days in

advance, and by allowing private citizens to donate food after it has reached its expiry date.

One of the biggest hurdles, though, will be to encourage use of "doggy bags" (renamed "family bags") in a culture that historically has frowned upon it. With its longtime acceptance of taking home restaurant leftovers, perhaps the United States will be the next country to update laws to make better use of food.

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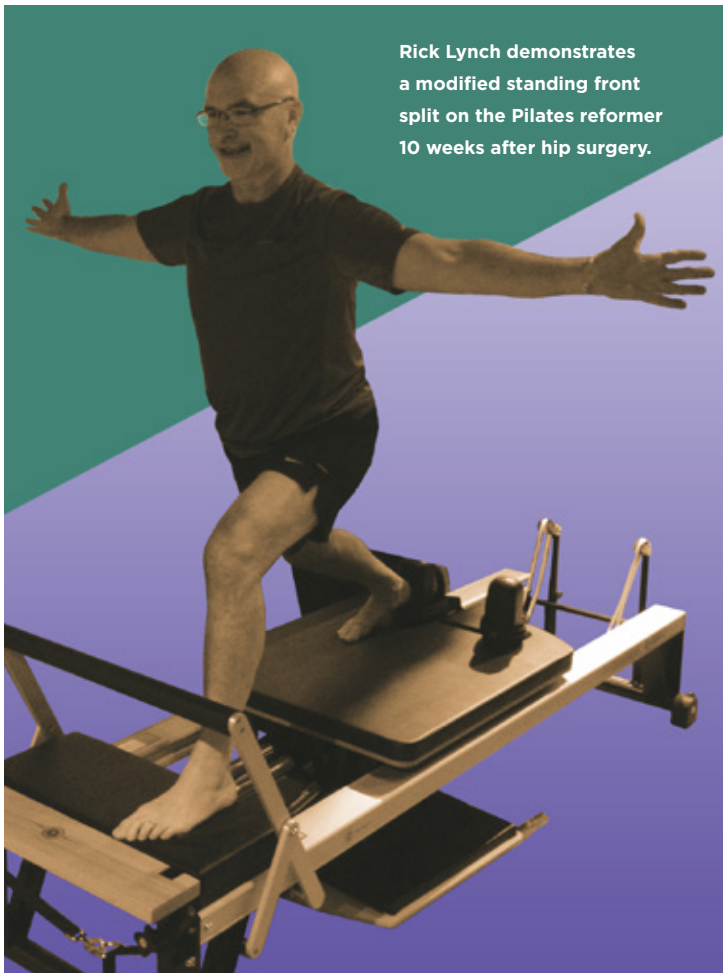

Rick Lynch demonstrates a modified standing front split on the Pilates reformer 10 weeks after hip surgery.

Pilates and Joint Replacement Recovery

BY NANCY E. MCCARTHY

Pilates reformer work helped yoga teacher Rick Lynch rehab after hip replacement. Here's why it worked—and how Pilates can help your clients before and after this type of surgery.

What do tennis icon Billie Jean King and singer-songwriter Billy Joel have in common (Doyle, P. 2010; Johnson, P. K. 2012)? Both are among the 7.2 million Americans walking around with artificial joints—two knees and two hips, respectively (Mont, M. & Issa, K. 2014; AAOS; NIH 2016B). Though most fitness professionals won't be creating a pre- or post-surgery program for people with such memorable monikers, we *are* likely to encounter an increasing number of clients who are having these procedures. (See "The Rising Demand for New Joints.")

BEYOND RELIEF: LIFE AFTER TJA

The outcomes of various types of joint replacement surgery, also called total joint arthroscopy (TJA), are usually favorable: Most patients experience a substantial decrease in pain and increase in mobility, enabling them to return to normal activities and exercise (NIH 2016A, NIH 2016B). How quickly a patient rebounds from TJA varies. Resuming activities fully after total hip arthroscopy (THA) can take 3–6 months; however, knee replacements can require up to a year of recovery. An individual's overall health, physical condition, age, attitude and adherence to physical therapy all contribute to their healing progression.

"Patients who are better conditioned prior to total joint surgery almost always rehabilitate more quickly than those who were deconditioned prior to surgery," says Elizabeth Wetmore, a physical therapist and certified exercise physiologist with the Sports and Spine Rehabilitation Center at the University of Rochester Medical Center in New York. "I've had patients who cancelled total joint surgery after aggressive prehabilitation programs."

While patients initially have postoperative positional restrictions, such as no kneeling after total knee arthroscopy (TKA) and no bending over after THA, these limitations are usually temporary. Resuming exercise to rebuild overall conditioning, as well as muscle strength around the new joint, are key components of the recovery process. For some TJA recipients, performing exercises on a Pilates reformer can be a game-changer in post-op recovery. This was certainly true for yoga instructor Rick Lynch, E-RYT 500®, owner of Finger Lakes Yoga Center in Canandaigua, New York. First, a bit of backstory. (See "A Pilates Primer" for some basics about this type of workout.)

POST-OP PILATES IN PRACTICE

Lynch usually eschewed traditional medicine. But after years of chronic, worsening pain, he finally submitted to an X-ray in 2014. What he had believed to be a lower back issue actually originated in his right hip; part of the femoral head was

The Rising Demand for New Joints

Statistics show that the surgical replacement of hips, knees and shoulders—known medically as total joint arthroscopy—has been on the rise for decades. For example, the number of total annual hip replacements among adults aged 45 and older *doubled* between 2000 and 2010 (Mont, M., & Issa, K. 2014; AAOS; Mayo Clinic).

Why the uptick? In part, it can be credited to the advancing age of baby boomers who want to continue the active lifestyle they've always enjoyed. Younger populations, too, are loath to abandon athletic pursuits due to joint damage and pain. And because today's new-and-improved joints are expected to hold up for 20-plus years, surgeons are increasingly willing to perform these procedures on a wider age-range of patients (Molloy, R. 2015). Recent projections of future TJAs predict that the under-65 age group will surpass boomers and seniors in joint replacement surgeries by the year 2030 (Mont, M., & Issa, K. 2014).

The upshot: Fitness professionals are increasingly likely to encounter clients who are considering TJA or are returning to exercise following it. The accompanying article offers insights into one type of exercise—Pilates reformer—that may help people both before and after their surgeries.

worn away. "My surrounding muscles were so strong that they masked the injury," explains Lynch, who credits his 30 years as a yoga instructor for his strength. At age 59, Lynch underwent hip replacement surgery.

Two days later, Lynch was released to his home, and the day after that, he was discharged from physical therapy after passing every benchmark—another testament to his exceptional presurgery condition. However, like all joint replacement patients, Lynch needed to strengthen and heal, as well as adhere to certain movement restrictions (e.g., not crossing his legs past his midline or bending over at a 90-degree angle). Lynch began practicing modified yoga at home and riding a stationary bike and, about a month after surgery, returned to teaching "at about 50% capacity."

Pilates reformer classes came into the picture about 10 weeks after Lynch's surgery, when he began taking classes at Core Rhythm Pilates in Victor, New York, in hopes of accelerating the recovery process. His instructor, studio owner Tracy Janczak, was a certified STOTT PILATES® instructor who also holds a special certification in Pilates for special populations, which addresses modifications for post-TJA patients as well as seniors and people with back injuries.

Under the careful tutelage of Janczak, Lynch performed movements such as modified standing front splits, an exercise that requires core strength and balance and improves flexibility by deeply stretching the hip muscles. "Pilates challenged me," says Lynch, simply.

Lynch was released from all limitations by his surgeon at his 3-month marker. He

Tracy Janczak, a certified STOTT PILATES instructor, assists a client with a shoulder stand on the Pilates reformer.

A Pilates Primer

Pilates, which promotes quality of movement over quantity, was founded by Joseph Pilates in the 1920s. Utilized as a general exercise discipline, as well as a form of rehabilitative exercise for dancers and athletes, Pilates is based on precision movements that focus on the body's core (abdominals and back muscles) and then branch out to strengthen and elongate the entire body, improving muscle elasticity and joint mobility. "Many times, Pilates is mistaken for mat work performed in a group setting on a floor with props," says Lisa Bernardo, a certified STOTT PILATES® instructor at The Pilates Centre in Gibsonia, Pennsylvania, which she co-owns with her husband. "That type of Pilates practice is not best for some individuals, particularly those going in for or coming out of joint replacement surgery."

was so profoundly impacted by the Pilates discipline that, 8 months after surgery, he trained to become an instructor, and he now teaches both Pilates *and* yoga classes.

PILATES FOR EVERY "BODY"

While Lynch's recovery was exceptional, thanks to his superior conditioning and motivation, Janczak firmly believes that Pilates is truly for every "body." (This, of course, after they have been cleared for exercise by a doctor or physical therapist.) Fellow STOTT PILATES-certified instructor Lisa Bernardo agrees. Bernardo is co-owner of The Pilates Centre in Gibsonia, Pennsylvania, a registered nurse and certified exercise physiologist who has worked with several joint replacement clients utilizing the reformer before and after surgeries. Several of them have been referred to her by physical therapist Brian Caricato, North/Central Region facility director for the University of Pittsburgh Medical Center.

"When recommending Pilates for patients following total joint surgery after they have been discharged from physical therapy, it is very important to have good communication with the Pilates instructor," says Caricato. Up front, the physical therapist and the Pilates instructor should "discuss any limitations and contraindications associated with the patient's condition so that they may safely continue to build upon their progress toward returning to an active lifestyle."

RESULTS MAY VARY

Every person—and patient—is unique, and so is their experience with post-TJA Pilates. If you have clients who have undergone replacement surgeries, you have likely seen this firsthand.

Bernardo worked with one client in her 50s, recommended by Caricato, who was overweight, walked with a cane and was in excruciating pain; her knee joints had deteriorated to bone-on-bone. Bernardo led her through a presurgery Pilates program, which provided significant pain relief, as well as the physical conditioning necessary to recover more efficiently from each operation. The client lost weight, strengthened her abdominals and quadriceps, and was able to ambulate more easily even *before* her joint replacements. After each surgery, the client continued her Pilates sessions, and the complete healing time for both surgeries and recoveries totaled 18 months.

In comparison, another client in her late 60s was in great physical condition prior to surgery, had excellent body awareness, and sailed through a double hip replacement. After just a few private reformer sessions, she returned to group classes—just 6 weeks after her second hip replacement.

EXPLORING THE OPTIONS

No program is one-size-fits-all, but Pilates is clearly a great fitness avenue to be explored by joint replacement candidates and personal trainers with Pilates certifications. Pilates restores the alignment of the body, corrects imbalances, develops core strength and strengthens and lengthens musculature—all of which are necessary for healthy joint function. And that's beneficial for any "body." **AF**

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AF Q+A

YOU ASK, WE ANSWER

BY MATT BRZYCKI

STRATEGIES TO INCREASE MUSCLE SIZE, STRENGTH AND RACING SPEED.

ARE LOW REPS REALLY BEST FOR INCREASING MUSCLE SIZE?

According to weight-room lore, doing low reps with a high load increases muscular size, and high reps with a low load improves definition or tone. But there's little scientific support.

In a recent study, 18 male subjects (average age 23.3) were matched for baseline strength and split into two groups: One did 25–35 reps per set, and the other group did 8–12 reps per set. Both groups did 3 sets of seven different exercises for all of the major muscles and trained three times per week.

After 8 weeks, both groups experienced significant size increases in the biceps, triceps and quadriceps. There were no significant differences between the groups. In other words, both low reps and high reps increased muscular size to the same degree.

REFERENCE:

SCHOENFELD, B. J., ET AL. 2015. EFFECTS OF LOW- VS. HIGH-LOAD RESISTANCE TRAINING ON MUSCLE STRENGTH AND HYPERTROPHY IN WELL-TRAINED MEN. *JOURNAL OF STRENGTH AND CONDITIONING RESEARCH, 29* (10), 2954–2963.

HOW EFFECTIVE IS IT TO ATTACH CHAINS OR ELASTIC BANDS TO A BARBELL?

Elastic bands and chains vary the resistance gradually as an exercise is being performed. With bands, the resistance varies as the band lengthens and shortens; with chains, the resistance varies as links are raised and lowered to the floor.

In one meta-analysis, researchers pooled data from seven studies that involved 235 subjects (average age 21.2). Improvements in maximum strength were significantly greater in subjects who did exercises with either elastic bands or chains, compared to those who did exercises without them. This was especially true for subjects who had been lifting for at least 2 years or were classified as "trained."

REFERENCE:

SORIA-GILA, M.A., ET AL. 2015. EFFECTS OF VARIABLE RESISTANCE TRAINING ON MAXIMAL STRENGTH: A META-ANALYSIS. *JOURNAL OF STRENGTH AND CONDITIONING RESEARCH, 29,* (11) 3260–3270.

CAN 10-20-30 TRAINING IMPROVE RACE TIMES??

The numbers "10-20-30" refer to three consecutive intervals adding up to 60 seconds, with each interval requiring an increased effort. For running, this would involve 30 seconds at an easy pace (30% max), 20 seconds at a moderate pace (60% max) and 10 seconds at 90–100% max. (Note: In practice, the sequence used is 30-20-10.)

In one study, 160 recreational runners (average age 48.3) were divided into two groups: One did 10-20-30 training twice per week and endurance training once, while the other group did endurance training three times per week. Here, 10-20-30 training consisted of five 60-second intervals, then 2 minutes of recovery, with the entire cycle repeating three or four times.

The result: After 8 weeks, the 10-20-30 runners significantly improved their time in a 5-kilometer run by 38 seconds, while the other group experienced no change. **AF**

REFERENCE:

GLIEMANN, L., ET AL. 2015. 10-20-30 TRAINING INCREASES PERFORMANCE AND LOWERS BLOOD PRESSURE AND VEGF IN RUNNERS. *SCANDINAVIAN JOURNAL OF MEDICINE & SCIENCE IN SPORTS, 25,* (5), E479–89.

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