american FITNESS®

SLEEP
A SECRET WEAPON IN PROGRAM DESIGN

CEU CORNER:
EXERCISE RESEARCH ON AGING WELL

+

ARE YOUR CLIENTS READY FOR THE HOLIDAYS?

KAISA KERANEN
REDISCOVER THE JOY OF MOVEMENT

NASM NATIONAL ACADEMY OF SPORTS MEDICINE | AFAA® ATHLETICS AND FITNESS ASSOCIATION OF AMERICA
ELEVATING TODAY'S FITNESS PROFESSIONALS.

FALL 2018


AFAA
ATHLETICS AND FITNESS ASSOCIATION OF AMERICA
AFAA ROCK STARS
DON'T SING.
THEY LEAD.
They've pushed the boundaries. Reached into your soul.
And taken clients – and their classes - to a higher level.
These aren't your everyday group instructors.
THESE ARE THE ROCK STARS.
We want you to nominate your fellow AFAA Certified Fitness Pros. The ones that have taken you to an 11 out of 10. Leaving you feeling not just healthier and happier, but transformed.
The winning Fitness Professionals will be treated like the rock stars they are, including a feature on our Instructors Who Rock page, as well as a shout out on our heavily trafficked social media channels.
GET NOMINATING. AND GET READY TO ROCK. | Visit afaa.com/instructors-who-rock

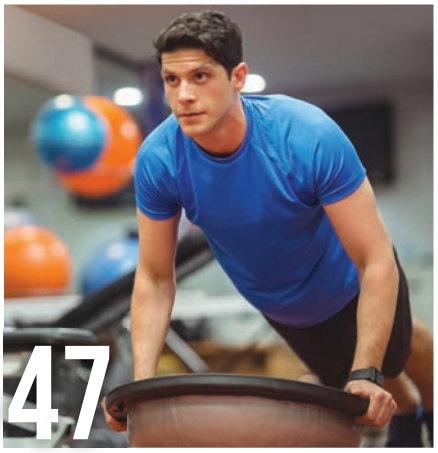
FALL 2018

VOLUME THIRTY-SIX // NUMBER FOUR

PHOTO: CORY SORENSEN; HAIR AND MAKEUP: DONNA GAST

ON THE COVER

COVER PHOTO
SIMON NEEDHAM



RESEARCH, INDUSTRY NEWS, BUSINESS TIPS

FEATURES

PERSONAL TRAINING

GROUP EXERCISE

NUTRITION

RESTORATIVE MOVEMENT

AFAA-NASM NEWS & VIEWS

AMERICAN FITNESS

ATHLETICS AND FITNESS ASSOCIATION OF AMERICA (AFAA)
WEBSITE: afaa.com
EMAIL: customerservice@afaa.com
PHONE: 800.446.2322 | 602.383.1200
MAIL: 1750 E. Northrop Blvd., Ste. 200
Chandler, AZ 85286

NATIONAL ACADEMY OF SPORTS MEDICINE (NASM)
WEBSITE: nasm.org
EMAIL: nasmcares@nasm.org
PHONE: 800.460.6276 | 602.383.1200
MAIL: 1750 E. Northrop Blvd., Ste. 200
Chandler, AZ 85286

SUBMISSION GUIDELINES: Send all editorial queries to americanfitness@nasm.org. Please tell us more about your topic, why it would be relevant to the health and fitness community, areas covered, and your qualifications to write the piece. Your query will be reviewed for timeliness, relevancy and accuracy. If we feel it will be valuable for our audience, we will follow up with you.

CHANGE OF ADDRESS: Please provide old and new address details to AFAA, ATTN: Membership, 1750 E. Northrop Blvd., Ste. 200, Chandler, AZ 85286 or call 800.446.2322.

CAUTION TO READERS: The opinions, information and recommendations contained within articles, features, columns and advertisements of this magazine are not necessarily those of the publisher, AFAA, NASM or their parent corporations or affiliates. The publisher and contributors cannot guarantee such materials are safe and proper for every reader or for every reader's students and clients. Readers are urged to consult a physician before using or relying upon such materials, and to advise their students and clients to do so as well. This magazine and its contents are sold without warranties or guarantees of any kind, expressed or implied, and the publisher and contributors disclaim any liability, loss or damage caused by the contents.

 AMERICAN FITNESS (ISSN 0893-5238) IS PUBLISHED QUARTERLY BY THE ATHLETICS AND FITNESS ASSOCIATION OF AMERICA (AFAA). PERIODICALS POSTAGE PAID AT CHANDLER, ARIZONA. SUBSCRIPTION PRICE OF $39 PER YEAR IS INCLUDED IN AFAA AND NASM CERTIFICATION DUES. POSTMASTER: SEND ADDRESS CHANGES TO *AMERICAN FITNESS*, 1750 E. NORTHROP BLVD., STE. 200, CHANDLER, AZ 85286. VOLUME 36, NUMBER 4.

LAURIE McCARTNEY, PRESIDENT

TAKE FIVE

CHECK OUT FIVE OF OUR FAVORITE HIGHLIGHTS FROM THIS ISSUE!

A FIT AND HEALTHY LIFESTYLE

What does a fit and healthy lifestyle mean to you? For many of us, it's more than part of the job; it's something that makes us feel good. It elevates our heart rate and our mood. We want everyone to experience these benefits and all the other positives—physical, emotional and even cognitive—that come from, well, just *moving.* That's really what got us into this career path, right?

One woman who understands this implicitly is Kaisa Keranen, one of the top fitness influencers on social media, with over 771,000 Instagram followers. In her talk with *American Fitness* (page 30), Keranen radiated boundless energy and an infectious smile as she shared the evolution of her fitness journey and her mission to bring physical activity to the masses. She also highlighted her three-pronged approach—Educate, Motivate, Empower—for helping clients to realize all the amazing things their bodies can do and to understand that "health does not look a certain way." As you might have seen on her KaisaFit posts, her exercise moves are not confined to the gym. Says Keranen, "Moving is getting out there and doing anything you want to do." We are proud to have this exciting fitness leader as our NASM Optima 2018 keynote speaker on October 13, when she will highlight her journey to #JustMove.

Another important share from Keranen: A "no pain, no gain" training mentality can leave your body trashed. Her words on trusting our inner dialogue remind us it's okay to take an easy day when we (or our clients) need to. In fact, recovery is a key component of a fit and healthy lifestyle, as we discuss in more depth in "Get Some Sleep" (page 67) and in our quick guide to spotting signs of overtraining (page 8).

Maintaining a healthy and fit lifestyle can be more of a challenge as hectic holiday schedules loom on the horizon. We asked four NASM Master Trainers to share their best tactics for keeping clients on track (page 38). Not only do these experts dive into the mindsets behind some of your clients' real-life challenges regarding holiday food, fitness and social pressures, but they also offer time-tested, actionable solutions you can start implementing now, before winter hits.

As fitness professionals, we are motivated to progress our skills and abilities and want to inspire others to do the same. Sometimes this can be as simple as a little push here or a pull there, as seen in "Learn the Power of Perturbations" (page 47). Here, we look at workout tools and techniques that can add new variables to your programming, whether you're training one-on-one or partnering up participants. For our older clients, motivation can come in the form of shoring up bones and muscles to maintain health and independence. Our CEU Corner, "Working With Older Adults" (page 18), provides need-to-know details on which types of workouts can stave off certain health challenges and how to keep this population safe when participating.

This issue offers all that and much more to help you keep your passion for a fit and healthy lifestyle burning strongly—and, in turn, to elevate your career and your clients' success. Listen to Keranen and take a few minutes today to remember why you fell in love with fitness, then keep spreading that joy to as many people as possible, throughout the holidays and beyond.

Wishing you health and happiness,

Laurie McCartney
President – Global Fitness & Wellness Solutions

facebook.com/personaltrainers/
facebook.com/afaa.fit/

instagram.com/nasm_fitness/
instagram.com/afaa_certified/

up to **40% off** every order

create your account:
HYLETE.com/af

Trainers who hold an active NASM or AFAA certification receive up to 40% off on every HYLETE.com order, including NASM and AFAA co-branded apparel and gear.

BY LAURA QUAGLIO

Training Edge [INDUSTRY NEWS, INSIGHTS & TOOLS]

YOUR ACL Defensive Line

Last season alone, 57 National Football League players suffered tears to the anterior cruciate ligament (https://www.playsmartplaysafe.com/newsroom/reports/2017-injury-data/). However, football players haven't cornered the market on this type of injury. Experts estimate that 350,000 ACL reconstructive surgeries are performed annually in the United States, with 20% of patients reinjured within a 2-year period (2017; doi:10.1007/s12178-017-9416-5).

Fortunately, the same strategies that can be used to prevent ACL tears on the football field can also be employed with youth athletes and the general population, says Andrew Mills, owner of Achieve Wellness, a full-service wellness center in St. Louis, where fitness pros can receive hands-on classroom experience for NASM's certification and specializations.

"The Performance Enhancement Specialization from NASM teaches trainers how an athlete should move," says Mills, "and the Corrective Exercise Specialization demonstrates how to *get* the athlete to move that way." The CES can also help trainers reduce an athlete's risk of recurrence by addressing the compensations that likely caused the injury in the first place. Here, a few tips from Mills:

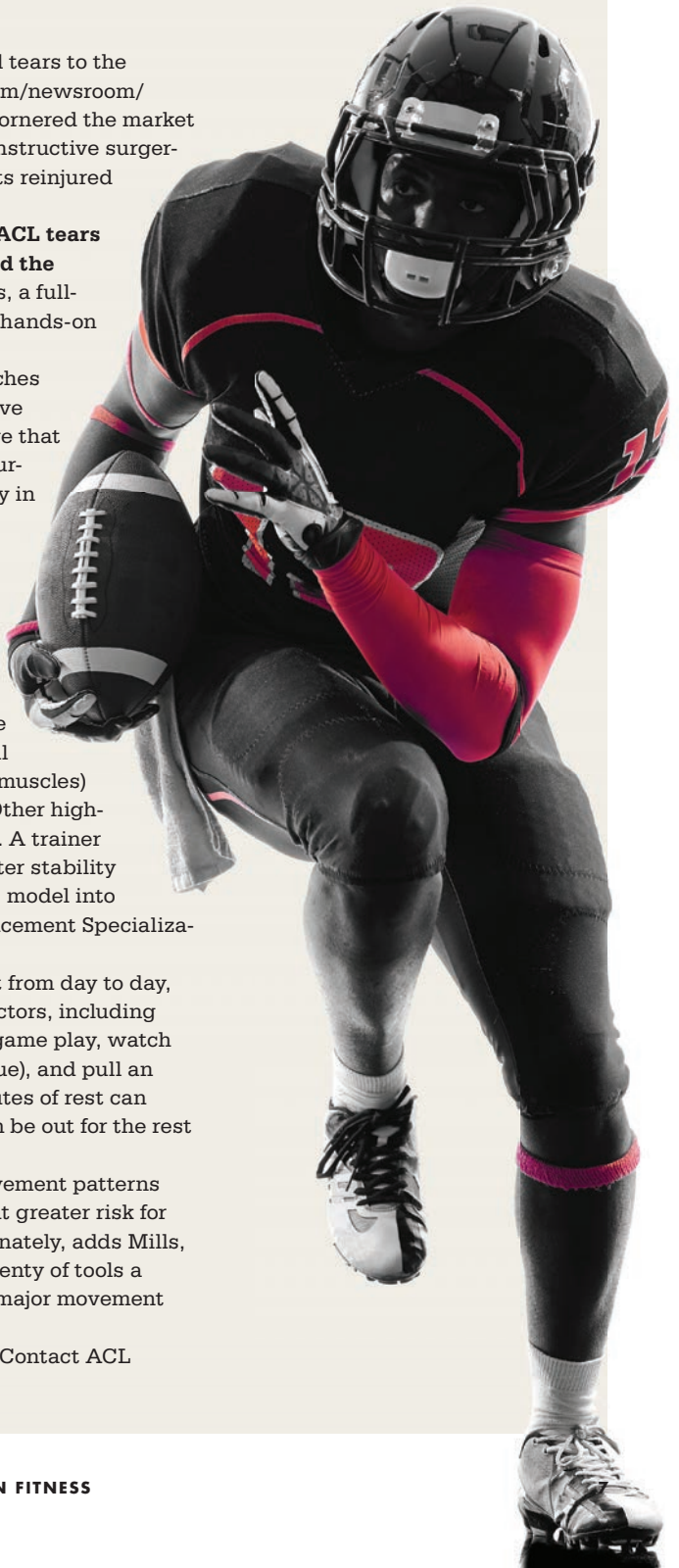
Employ ongoing assessments. Start with some baseline measures, then watch to see how athletes move during drills, both when fresh and when fatigued. Basic assessments like the overhead squat and single-leg squat can be revealing for most individuals, but for well-conditioned athletes, transitional assessments may be needed for compensations to emerge.

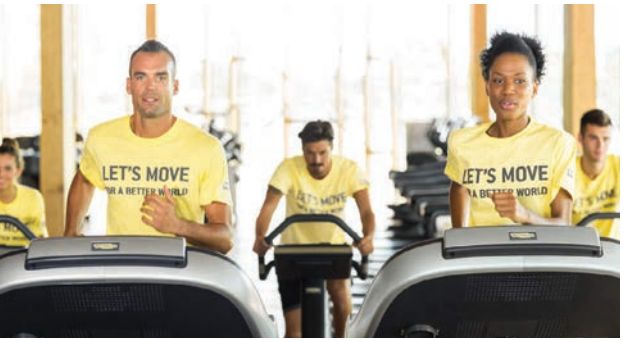
Know the positions that increase risk. For example, at the line of scrimmage, linemen kneel in a position that lengthens the gluteal muscles. This often means synergists (hamstrings and lower-back muscles) are recruited for driving forward, which can destabilize the knee. Other high-risk moves for the ACL include quick stopping and cutting motions. A trainer can improve a client's fine motor skills in the joints and create greater stability by weaving Phase 1 of the NASM Optimum Performance Training™ model into sessions and utilizing techniques based on the Performance Enhancement Specialization and the Corrective Exercise Continuum (explained in the CES).

Don't wait to pull athletes from play. Fatigue will be different from day to day, play to play, and player to player, and it can be affected by many factors, including overall wellness, repetitive impact and even weather. Throughout game play, watch closely for lower-body compensations (which often come with fatigue), and pull an athlete off the field or court as soon as signs appear. Even 3–5 minutes of rest can prevent injury. "It's better to have a player miss part of a game than be out for the rest of the season," says Mills.

Implement big changes in the offseason. Correcting poor movement patterns during the season may compromise performance *and* put athletes at greater risk for injury as they try to do something new while under pressure. Fortunately, adds Mills, the NASM OPT™ model and Corrective Exercise Continuum offer plenty of tools a trainer can use to reduce an athlete's injury risk without imposing major movement changes during the season.

Learn more: Read "Corrective Exercise: Reducing Risks of Non-Contact ACL Injury," by Andrew Mills, on the NASM blog (blog.nasm.org.).





Join the Movement!

Let's Move for a Better World™

For over 20 years, Technogym® has been promoting wellness as part of a healthy lifestyle. Five years ago, the company took its wellness commitment to a higher level with the worldwide social campaign **Let's Move for a Better World™**. This program enables participating fitness facilities to invite their members to use the cloud-based mywellness® app to log their MOVES (with a MOVE being Technogym's unit of measure for movement). The more MOVES a facility racks up, the more pieces of Technogym equipment will be donated to the not-for-profit organization of their choice.

In 2018 (so far), over 180,000 LMFABW participants from 1,033 fitness facilities in 29 countries have logged 628 million MOVES and burned more than 263 million calories, equating to about 83,000 pounds lost.

Participating in LMFABW can also make your *business* healthier: Fitness facilities that have taken part have reported

- a 14% increase in number of members,
- a 26% increase in member attendance, and
- an increased ability to attract new members.

Members, in turn, enjoy participating in a campaign that promotes wellness and raises awareness to reduce obesity and sedentary behavior—all while working toward their own personal fitness and wellness goals. Inspiring people to become more physically active will, in turn, make for a healthier world population. And that's good for all of us.

Learn more at technogym.com.

When *Overtraining* Means *Overdoing* It

Stress (in moderation) is a good thing: It helps us adapt and improve as our body rebuilds during recovery. It is this concept—that we are better/stronger/faster after a push—that drives many athletes to try overload training. However, recent research at the University of Guelph in Ontario has found that, on a micro level, the effects may not always be so positive.

In a small study, published in *Medicine & Science in Sports & Exercise,* researchers measured nerve activity by inserting a needle into a lower-leg nerve of healthy recreational endurance athletes after workouts (2018; 50 [5], 928–37). From this, they could tell if each athlete was in a recovery state (with the parasympathetic nervous system activated) or a stressed state (with a heightened fight-or-flight sympathetic nervous system response). The researchers discovered that athletes who overtrained (at 150% of their usual workout load) showed a boost in SNS activity, which temporarily hindered their recovery. Those who stuck to their regular training regime, however, showed more activity in the PSNS, as well as improvements in markers for fitness and cardiovascular health.

Fabio Comana, MA, MS, who reviewed the findings for the National Academy of Sports Medicine, was intrigued by both the methods used and the findings. "Recovery is becoming the new darling in exercise," says the faculty instructor for NASM. He believes that more research—and, eventually, more means of measuring recovery—will be available in wearable technology in the next 5 years or so.

For fitness professionals, this means there will be ways of determining, at a nervous-system level, "whether it's a HIIT day or a yoga day," he explains. Having such methods will also make it easier to individualize workouts for team players, based upon their readings on any given day. "I love the idea that we're going in that direction," says Comana.

QUICK STRESS CHECKS

Until our tech is able to detect how stressed our bodies are based on pulse, breathing, and chemical and neurological changes, Comana recommends clients track their resting heart rate and heart rate variability and communicate results to their trainer.

FOR RHR, clients should take their pulse each morning when they wake up naturally (not by an alarm). If RHR rises over the course of a week, that's a sign of stress.

FOR HR VARIABILITY, clients simply need to take their pulse or listen to their heartbeat during controlled breathing. In healthy adults, heartbeat naturally speeds up during inhalation and slows during exhalation. If it doesn't, it could be a sign that they're worn out.

Can Giving Up Exercise Trigger Depression?

It has long been shown that exercise can reduce depressive symptoms and effects of major depressive disorder, but little research has been done on the impact of exercise *cessation.* In a study published recently in the *Journal of Affective Disorders* (2018: 234, 180–92), researchers investigated the impact of exercise cessation specifically on adults who were regularly active. Findings showed that, when healthy adults ceased exercise, there was a resultant increase in depressive symptoms after 3 days, 1 week and 2 weeks.

Among the 152 healthy adults who fit the study criteria (50 of whom were women), the effects were significantly greater in women than in men.

With October being Depression Awareness Month, it's a great time to encourage clients to stick with their exercise program—even through the hectic holidays on the horizon.

10 **. . . minutes of physical activity per week needed to increase a person's level of happiness**

Source: *Journal of Happiness Studies,* 2018. doi.org/10.1007/s10902-018-9976-0

PILATES CAN BOOST RUNNING PERFORMANCE

In a study published by *PLOS ONE,* trained distance runners who engaged in a 12-week Pilates program showed significant improvements in running economy, performance and recovery. This fun fact may help fit pros make a case to clients that supplementing their running routines with a Pilates repertoire could be beneficial.

Form Fix-Up With Mike Fantigrassi: The Bench Press

The bench press is among the most popular gym exercises, but that doesn't mean it's simple. "If you're not using correct form, you can put a lot of stress on the shoulder joints," warns Mike Fantigrassi, NASM-CPT and Master Instructor. "The shoulder has the most mobility of all joints," he adds, "which makes it less stable" and more vulnerable to injury. Try Fantigrassi's tips to make the most of your bench press exercises:

Prepare with pushups. This exercise requires stabilization of the shoulder joint and bodywide tension, both of which are vital to a safe bench press. Progress to plyometric pushups for added challenge.

Strive for safety. To maintain good balance during the bench press, feet should be flat on the floor, not on the bench. The barbell should rise directly over the chest, not the neck, and a spotter should be used for nonmachine presses. Also, watch the wrists: Don't let them bend back. Grip with the thumb around the bar, not over it. A false (thumb-over) grip makes it easier to drop the weight on yourself.

Keep it controlled. Simply put, a successful bench press includes unracking the weight, bringing it down, letting it touch the chest without bouncing off it, then pressing it straight up and racking the weight again. Don't use momentum; movement should be controlled throughout.

Use supersets. The bench press works great in supersets based on Phase 2 of the NASM OPT™ model, in which you alternate between a strength exercise and a stabilization move. Try supersetting a plate-loaded chest press and a pushup (with a proprioceptive demand) or a machine press and a standing cable fly.

Balance it out. As part of your overall program, be sure to include a pulling motion, such as a type of row (see *American Fitness,* Summer 2018) to work the antagonistic muscles. It is also a good idea to perform rotator cuff exercises before the workout and to include foam rolling and static stretching afterward to maintain good range of motion in the shoulder joint.

"It's okay *not* to bench press, too," adds Fantigrassi, who usually skips the exercise owing to a torn rotator cuff. "There are lots of good chest exercises—dumbbell incline press, standing cable press, different types of flys and pushups. If you're dreading the bench press or it doesn't feel good, do something else."

Sample: Chest Workout

For better gains and lower injury risk, Fantigrassi advises *against* doing the same bench press routine each week. He suggests using the NASM OPT model for progressions, then cycling through the phases every 4 weeks. Here's a sample plan.
Note: For Phases 1–3, rest 1 minute between sets.

PHASE 1: STABILIZATION

For both: Do 12–15 reps, slow tempo.
Dumbbell chest press (3 sets, 50%–70% 1RM)
Pushup, hands on stability ball (2 sets)

PHASE 2: STRENGTH ENDURANCE

Do 3 supersets for A and B, 8–12 reps, with A1/B1 at moderate tempo and A2/B2 slow.
A1: Barbell bench press (70%–80% 1RM)
A2: TRX® pushup
B1: Incline chest press (70%–80% 1RM)
B2: Standing incline cable fly (50%–70% 1RM)

PHASE 3: HYPERTROPHY

Descending pyramid bench press (4 sets: 12, 10, 8, 6 reps).
Incline chest press (3 sets, 6–8 reps, 75%–85% 1RM)
Machine chest fly (3 sets, 8–12 reps, 75%–85% 1RM)

PHASE 4: MAXIMAL STRENGTH

Use fast but controlled tempo, with 3-minute rest between sets.
Bench press (5 sets, 5 reps, 85%–100% 1RM)
Incline barbell bench press (3 sets, 5 reps, 85%–100% 1RM)

Screen Time May Matter Less If You're Fit

Testing grip strength may provide a quick, inexpensive way to tell if a person needs to cut back on screen time. Researchers from Glasgow University, Scotland, analyzed 5 years of data from nearly 400,000 participants, looking at all-cause mortality, cardiovascular disease and cancer, along with grip strength, self-reported screen time and amount of physical activity. Results published in *BMC Medicine* (2018; 16 [1]) stated that "the associations of overall discretionary screen time with all-cause mortality and incidence of CVD and cancer were strongest amongst participants in the lowest tertile for grip strength."

In conclusion, researchers noted that "increasing strength and fitness may provide a means of offsetting the potential adverse consequences of high screen time" and that people with low levels of grip strength and fitness/activity may benefit most from interventions designed to get them on their feet.

Boost Member Retention

WITH JUST ONE GROUP EX SESSION PER WEEK

CPTs may worry about losing clients to the allure of group exercise, with its great music and multiplayer energy. But there's good reason to encourage gym-only exercisers to join in a group ex class. Recently, the Customer Engagement Academy examined gym members' activity choices in relation to attendance and loyalty. Led by Melvyn Hillsdon, PhD, from the Department of Sport and Health Sciences at University of Exeter, the study revealed that gym members who took just one group class per week in addition to working out in the gym were 20% more likely to be loyal (and promote their club to others) than were members who attended the gym three or more times per week but did not participate in group ex.

The article's recommendations: "Encourage members to take part in a range of activities in your club." Members who cited four or more reasons for attending (just 5% of study participants) were more than twice as likely to be loyal promoters than were those who had only one reason to show up (48% of study participants).

An Overview of Online Reviews: How Much Do They Matter?

"Most businesses do not realize how powerful reviews are," says Jason McDonald, PhD, a San Francisco–based marketing expert and author of *Social Media Marketing Workbook* (CreateSpace 2018). "Building a cache of positive reviews is very much like running a marathon: You can't do it on day one, but you can do it on day 100—*if* you stay with it." Here are some of his top tips for fit pros:

On Yelp: "Any local business can and should create, optimize and promote a listing on Yelp. You can do this for free (and ignore its pleas to advertise). It's very popular in 'blue' states and cities like San Francisco, Seattle and New York City, and it drives the review engine on Bing and can rank highly in Google searches."

On Google: "Generally, Google is more important for everything besides restaurants and bars. But I wouldn't say one or the other; I'd say look at both."

On Facebook: "Facebook reviews are the newest 'kid' on the block. So far, these do not seem to have any impact on Google ranking or overall search engine optimization (SEO), which refers to how much organic traffic you get online. But clearly Facebook is where people spend a lot of time, so I'd add it into the mix, too."

On getting good reviews: "The official terms of service of all review sites say you can't solicit reviews, but if you don't, you'll likely get only complaints. I recommend you ask a happy customer, face to face, 'Hey, could you do us a favor and post an honest review?' Or say 'Don't forget to review us!' (At your own risk, of course. It's technically a violation to do even that.) You might also place a Yelp sticker in a direct line of sight. Don't get discouraged if you have to ask 10 people to get one review."

On responding to bad reviews: "Take them very seriously, and offer help or a remedy if you can. But I don't recommend responding to [people who] are really unhappy or angry. Don't overly focus on that 1% of humanity that is just unhappy and bitter. Life is too short."

Visit jasonmcdonald.org to locate his blog, bio, classes and books, including the new SEO Fitness Workbook 2018.

WILLPOWER *Without* LIMITS

A new study in *Psychological Assessment* (doi:10.1037/pas0000557) sought to answer this question: **"Why do some people struggle with self-control (colloquially called willpower), whereas others are able to sustain it during challenging circumstances?"**

Christopher Napolitano, PhD, the study's lead author and a professor at the University of Illinois at Urbana-Champaign, said this in an interview with the school's news bureau:

"When we view our willpower as limited, it's similar to a muscle that gets tired and needs rest. If we believe it is a finite resource, we act that way, feeling exhausted . . . while people who view their willpower as a limitless resource get energized instead."

The best news of all: This point of view is changeable, says Napolitano. Cuing clients (and yourself) to view self-control as unending may be just what the doctor (of educational psychology) ordered!

LAURA QUAGLIO *is an optimist who hopes to learn to love running this fall. She is excited for autumn weather so boot camp will be less buggy.*

Build on a solid foundation with the NASM Corrective Exercise Specialization.

Establish yourself as a leader in the fitness industry. Every client you work with could be prone to common injuries. This establishes a need for fitness professionals to have the knowledge and skills to prevent injuries and keep clients coming back to achieve their fitness goals.

The NASM Corrective Exercise Specialization teaches you a variety of assessments to design effective programs to help your clients move, feel and live better.

NASM. Elevate your career.

SAVE $100* | **on the NASM Corrective Exercise Specialization (NASM-CES)**

Call 800-460-6276 | **Promo Code AF100CES.** Offer expires December 31, 2018.

*Terms and conditions apply. Excludes Life Time Academy and Exam Only programs.

Heads Up! Try These Hacks to Correct "Tech Neck"

MANY PEOPLE SPEND THEIR DAY WITH THEIR HEAD THRUST FORWARD, FIXATED ON PHONES OR COMPUTER SCREENS—HERE'S HOW YOU CAN HELP THEM STRAIGHTEN UP FOR BETTER POSTURE AND FEWER ACHES.

BY RICK RICHEY, MS

Chances are, whether you are trying to win a foot race, peering longingly into the eyes of a loved one or even reading this article, you are doing it. Most of us are doing it every day for hours on end as we look at our computers, tablets and phones. I'm talking about defaulting to a forward-head position, or tech neck.

Tech neck is when the head juts forward and often downward as we look at tech devices sitting on our desks, propped in our laps or held in our hands.

As fitness professionals, it is vital for us to address the goals our clients have, as well as to increase their awareness of postural compensations they may not yet know about. It is particularly important that we pay attention to the head position while clients exercise, as a forward-head position during resistance training can exacerbate problems associated with tech neck. What's more, there is often a correlation between forward-head positioning and *other* postural woes, such as **kyphosis** (increased flexion in the thoracic spine) and a protracted shoulder girdle, leading to a rounded back and internal rotation at the shoulder joint. As the lack of structural integrity spreads from a primary site to a secondary one, identifying the root cause of pain or discomfort becomes more difficult. All of the postural dysfunctions need to be addressed, but identifying and starting at the primary site of dysfunction (in this case, the tech neck) is more highly indicated.

What Is Tech Neck?

The tech-neck position is not rooted in tight neck muscles. Rather, it is the position of the devices we are using that causes us to round our upper back, protract our heads forward and often tilt them downward, as well. However, when we

spend prolonged periods in this position, adaptive shortening does occur, causing muscles responsible for the forward-head position to repeat and encode a motor pattern and become mechanically short. A few of the major muscles involved are mentioned below, along with their roles in tech neck. Synergistically, these muscles protract the head forward and tilt it upward into extension. Though this is not an exhaustive list of the muscles contributing to tech neck, they are primary players.

UPPER TRAPEZIUS AND ELEVATED SHOULDERS. The upper trapezius runs from the top of the shoulder blades up the back of the cervical spine, ending at the base of the skull. This muscle can concentrically create extension in the cervical spine and extension of the head on the cervical spine. The upper trapezius can also elevate the shoulder girdle, leading not only to the forward-head position but also to shrugged (or hunched) shoulders.

LEVATOR SCAPULAE AND SHOULDER TENSION. The upper trapezius gets blamed for a lot of issues that the levator scapulae is responsible for creating, such as scapular elevation, cervical extension and the shoulder stiffness that can accompany tech neck. The upper trapezius and levator scapulae have several joint actions in common, including cervical extension and elevation of the scapula, and the two muscles work synergistically in the tech-neck position.

STERNOCLEIDOMASTOID (SCM) AND FORWARD POSITIONING OF THE HEAD. The SCM runs from the sternum (S) and the clavicle (C) to the mastoid process (M), which is the bony landmark behind the base of the ear. Keeping in mind that the anchoring point is on the front of the body and the attachment point on the back of the head, it is easy to visualize how this muscle pulls the head forward—becoming easily overworked when this position is assumed for long periods of time, day after day—and tilts the head into extension.

UPPER-BACK EXTENSORS AND FORWARD-ROUNDED SHOULDERS/BACK. Thoracic flexion, or rounding of the upper back, can either lead to a forward head or develop from it. Upper-back rounding indicates weakness in the thoracic extensor muscles. Trainers often focus more on retraction and depression of the shoulder blades (i.e., pulling the shoulders "back and down") to address thoracic kyphosis, but strengthening the extensors of the upper back is more highly indicated.

DEEP CERVICAL FLEXORS AND A DOWNWARD-TILTING HEAD. Other muscles that must be addressed are the weak and underactive muscles that allow tight muscles (and gravity) to pull the head out of ideal postural alignment into a downward tilt. This happens particularly in people who gaze down at a phone or laptop rather than leaning forward toward a computer screen. These "weak and underactive" muscles include deep cervical flexors like the longus capitus and longus coli, which are designed to retract and flex the cervical spine.

All the corrective work in the world may not resolve a postural problem that is continually perpetuated. Therefore, counteracting tech neck is about not only correcting posture but also avoiding the positioning that ultimately led to the compensations in the first place.

Problems and Pain From Tech Neck

Aside from unflattering posture, what's wrong with having a forward head? Poor biomechanics combined with repeated motion (dynamic posture) or repeated lack of motion (static posture) can lead to pain and pathology at the cervical spine. Below is a small list of issues that commonly result from tech neck.

NEURAL IMPINGEMENT AND PAIN. When the head juts forward and extends, the space between vertebrae becomes narrower. This space, where the nerve roots leave the spinal cord, is known as the **foramen.** As the foramen narrows, it can impinge upon (or pinch) the nerve root. This can lead to sharp pain near the point of impingement and/or shooting pain down the path of the nerve. There may also be unexplained tingling along the line of the nerve that is being impinged. *If you suspect a client has neural impingement, send the client promptly to a doctor.*

DISK HERNIATION AND/OR PAIN. There are many degrees of disk herniation, but a simple explanation of this condition is that the disks between the thick bony segments in the vertebral column begin to bulge or balloon in areas. This does not always lead to pain. In fact, many people have disk herniations without any associated pain. However, when a disk balloons out so far that it pushes against the root of a nerve, there can be moderate to severe pain.

Corrective Strategies for Tech Neck

The more aware we are of the problems and solutions with tech neck in ourselves, the better we can support our clients. Take time to practice the NASM Corrective Exercise Continuum on yourself using self-myofascial release, static stretching, focused strengthening exercises and integrated dynamic movements. Below are examples from each stage of the continuum. Once you feel confident in the approach, apply the model to your clients.

Muscles targeted: Upper trapezius, levator scapulae, sternocleidomastoid (SCM).

SMR WITH TOOL: NECK AND SHOULDERS

Inhibit: Self-Myofascial Release

Add corrective strategies to the mix by using self-myofascial release (i.e., teach clients how to do this). Target the upper trapezius and levator scapulae with a small ball or tools like a Backnobber® (backnobber-store.com) or Thera Cane® (theracane.com).

Find tender spots along these muscles and hold pressure against each spot until the tenderness has subsided (30–60 seconds).

Lengthen: Static Stretching

Because sensitive nerves and blood vessels are located in the neck near the SCM, use static stretches for this area (SCM, scalenes, levator scapulae) instead of SMR. Hold for 30 seconds.

STATIC STRETCHING

Activate: Strengthening Exercise

While on all fours, let the head drop toward the floor in the forward-head position. Then retract the head into a neutral position, drawing a straight line from ears to shoulders to hips. The quadruped position allows the exercise to be done directly against gravity, providing a bit more resistance than is possible in the standing position. Do 10–15 reps with a 2-second isometric hold.

Note: This exercise does not call for heavy resistance to weigh down the head and "muscle it" out of the tech-neck form. To train the nervous system to encode a new pattern, frequent repetition of lightly resisted movements is all that is needed. Do not let the simplicity of the exercise lead you to think it does not work. This is a very effective exercise that clients can perform easily without equipment.

QUADRUPED

Integrate: Solidify and Coordinate

Integration exercises are often full-body moves that place a particular focus on the area being addressed. Pushups are a good choice here, as they put the head and neck in the same position as the activation exercise listed above, but with added work. It is important to cue clients to focus more on the head and neck position and less on how many pushups they can do. Modify the exercise to meet each client's needs. Aim for 10–15 reps.

PUSHUP INTEGRATION

HEADACHES. There are several different types of headaches, but here we are specifically referring to tension headaches. These occur when muscles around the neck and head become tight. Pain often presents as a squeezing sensation (like a band) around the head.

FACET JOINT ARTHRITIS, BONE DEGENERATION AND BONE SPURS. Facet joints occur where a flat bone articulates with another flat bone (as in much of the spinal column), and they slide along the surface of each other. The additional burden of a forward head can facilitate deterioration of cartilage between these bones, potentially causing arthritis. This cartilage deterioration can also lead to **eburnation,** defined as degeneration of bone into an ivory-like mass as a result of prolonged rubbing. Eburnation can lead to the development of **osteophytes,** more commonly known as bone spurs, in the cervical spine.

Perhaps clients can use tech to become more aware of tech neck—for example, by setting reminders on a smartphone to do a "neck check" or to stand up and stretch every 30 minutes or so.

How to Avoid Tech Neck

All the corrective work in the world may not resolve a postural problem that is continually perpetuated. Therefore, counteracting tech neck is about not only correcting posture and addressing compensations (see "Corrective Strategies for Tech Neck," page 16) but also avoiding the positioning that ultimately led to the compensations in the first place.

Talking to Clients About Movement Patterns

As a fitness professional, you know that the nervous system encodes patterns that cause us to follow predictable movements based on how often a pattern is practiced. Here's one way to use imagery to help clients understand the need to constantly monitor and counteract a poor movement pattern or posture: The encoding of motor patterns in the nervous system is like the carving of a riverbed where water has run for a long time. The longer and deeper the riverbed, the more difficult it is to redirect the water.

This is where the NASM Corrective Exercise Continuum is particularly smart. It not only pays attention to releasing and stretching tight muscles and facilitating activation in underactive muscles; it also includes the neuromuscular re-education that is needed afterward to encode new patterns. However, if we take clients through a series of steps to fix a problem and then the clients go right back to looking down at devices in their laps or lunging toward a desktop screen, they will not enjoy a long-lasting solution.

Preventing the Return of Tech Neck

Ultimately, for both our clients and ourselves, we need to set up an environment that allows us to keep our heads up. This can look odd. A trainer at one of my gyms in New York City was holding his phone up to his face rather than dropping his face toward his phone. It looked as if he was taking photos or videos of the gym and those in it. I actually had to request that he take his perfect phone posture to a more isolated location so as not to make patrons and clients uncomfortable. I guess no good posture goes unpunished!

There are many articles and insights on the ergonomics of screens, and it seems that all screens need to be brought in line with the head. Knowing this will not necessarily keep people from jutting their head forward—clients can't think about head position the entire time they are at a computer. However, if we help them become aware of the malalignment and learn how to keep posture top of mind, they can begin to encode a better neural pathway.

Raising Awareness to Realign Posture

Clients need to be conscious of their postural propensities; they need to think about their posture, fix it when out of alignment, and be aware of their tendency to let the head drift anteriorly when they are looking at a tech device. Perhaps they can use tech to become more aware of tech—for example, by setting reminders on a smartphone to do a "neck check" or to stand up and stretch every 30 minutes or so. They can also simply reposition their devices closer to the head, rather than moving the head closer to the devices.

As children who never knew life without a smartphone, tablet or computer grow into adulthood, fitness professionals are likely to see tech neck rear its ugly head more and more frequently. By explaining and applying the approaches detailed in this article, we can hack tech neck and help ourselves and our clients avoid the flesh-and-bone ramifications of this modern-day dilemma.

RICK RICHEY, MS, LMT, NASM-CPT, CES, PES, *is a fitness industry educator and owner of ReCOVER and Independent Training Spot in New York City. He has trained numerous high-profile clients and is completing his doctoral dissertation in health science at California University of Pennsylvania.*

Working With Older Adults: *Health Challenges That Exercise Can Help*

BY JAN SCHROEDER, PHD

Taking on clients aged 65 and older can do more than expand your client base. Research shows it provides life-changing rewards—for both clients and fitness professionals.

Have you noticed an increase in the number of older adults you're training or leading in your group ex classes? Currently, older adults (aged 55 and older) are the largest population frequenting our fitness facilities (Schroeder & Donlin 2013). One reason is the "graying of America," which refers to older adults being the fastest-growing segment of our population. Another reason is that the health benefits of exercise, which can include staying independent, are becoming better known to older individuals, who, in turn, are making it part of their lifestyle.

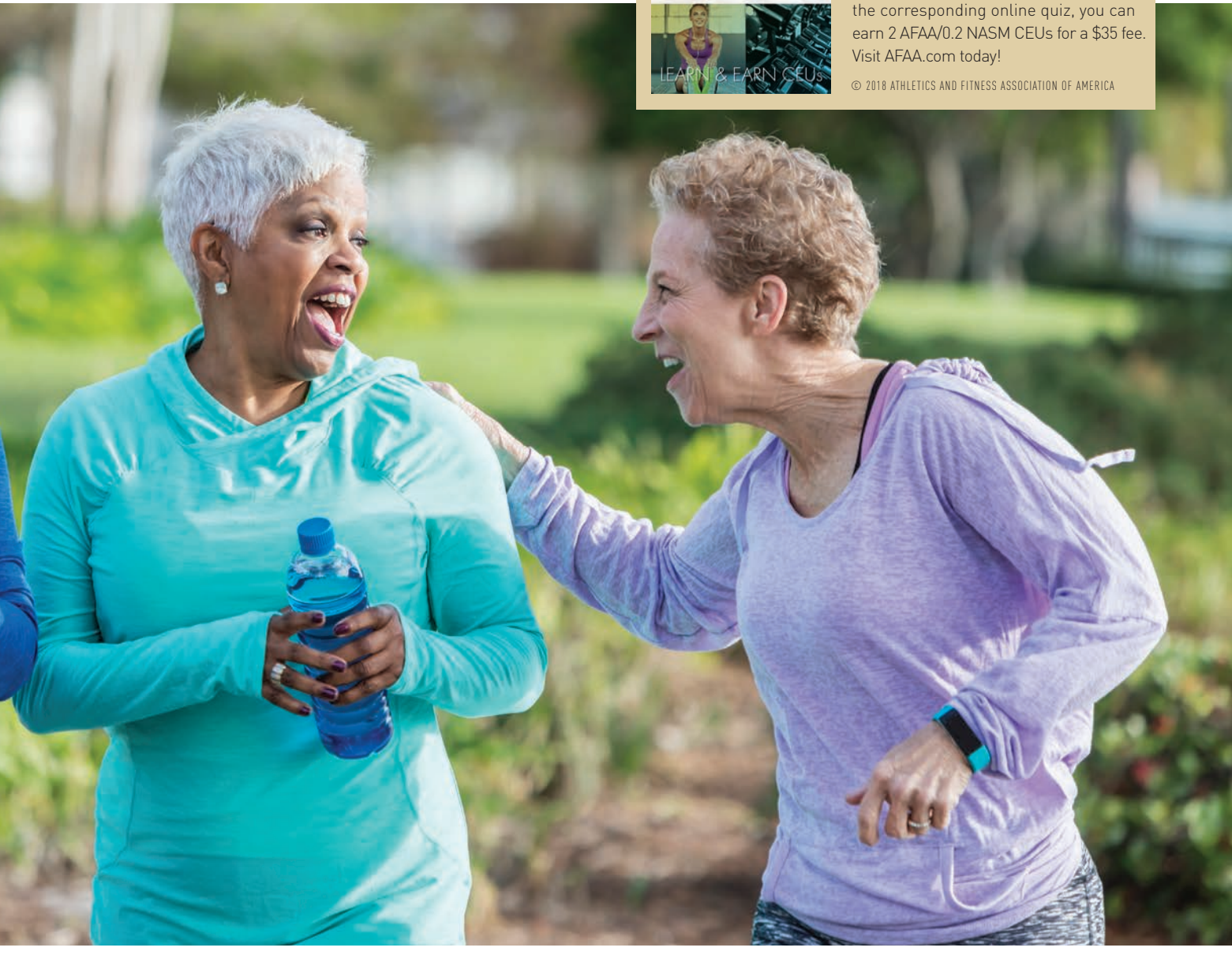
For personal trainers and group exercise instructors alike, an increase in client numbers in any population can be a boon to business. However, training this age group requires special knowledge, care, modifications and safety considerations, as older adults are likely to have more health issues than younger adults.

In this article, we will review several common health concerns of this age group—frailty and sarcopenia, osteoporosis, cardiovascular disease, type 2 diabetes, and Alzheimer's disease—and how regular exercise affects their progression. When working with older adults, it is important to be aware of the multiple challenges you may encounter, so you can adjust your programming to provide a workout that is safe, effective and enjoyable.

Muscle Health & Sarcopenia

Sarcopenia, defined as loss of muscle mass and function, is considered one of the causes of frailty in older adults. In Clegg et al. (2013), **frailty** is said to exist when multiple physiological systems weaken, making it more difficult for the body to return to homeostasis after a stressor event; however, there is no one agreed-upon definition of frailty (see "Frailty and the Older Adult" page 20).

Beginning as early as the fourth decade of life, skeletal muscle mass and strength



begin to decline in a linear manner, with up to 50% of mass being lost by the eighth decade of life (Metter et al. 1997).

THE DEVELOPMENT OF SARCOPENIA

The changes associated with sarcopenia are characterized by overall declines in the size and number of skeletal muscle fibers—mainly the fast-twitch (type II) muscle fibers—and a noticeable infiltration of fibrous and adipose tissue into the muscle (Lexell 1995). In addition, there is a reduction in the number of **satellite cells,** which begin the process of muscle repair and regeneration in response to heavy muscle use or injury; this is also most prevalent in type II muscle fibers (Snijders, Verdijk & van Loon 2009). All of these changes lead to declines in the muscular system's strength, mass and function.

The consequences of worsening sarcopenia can be quite severe, including such adverse health outcomes as increased insulin resistance, falls, fatigue and even death (Peng et al. 2012; Newman et al. 2006; Landi et al. 2012).

EXERCISE FOR MUSCLE STRENGTH AND FUNCTION

Among older adults, most sarcopenia interventions have focused on improving environmental causes, namely through boosting physical activity levels and providing adequate nutrition.

Resistance training effectively increases strength in older persons with sarcopenia and frailty (Landi et al. 2014). Through mechanical loading (via strength and/or aerobic exercise), we find improvements in muscle protein synthesis, increases in myofibrillar protein through activation

of satellite cells, and decreases in fat infiltration into muscle (Timmerman et al. 2012; Aagaard et al. 2010). Together, these benefits allow older adults to show improved outcomes for mobility and functional ability (de Vries et al. 2012; Theou et al. 2011).

Power training has proved to be more effective for enhancing physical function in older adults than conventional slow-velocity training (Miszko et al. 2003). While power training may not be the starting point for most clients, it does improve gait speed and performance of functional tasks such as standing up from a chair and climbing stairs (Bassey et al.1992; Beijersbergen et al. 2013). Moreover, power training specifically targets the type IIb muscle fibers, which are the ones most affected by age-related atrophy (Lexell 1995).

Editor's note: For more on this, read "Speed, Agility and Quickness for Adult Clients" in the Summer issue. To read more about research on slow resistance training, read this issue's Q+A column, page 70.

EXERCISE SAFETY WITH FRAILTY AND SARCOPENIA

Fitness professionals should be aware of exercises that may increase the risk of falling in frail older adults. Due to lack of strength, these clients may have trouble with toe clearance when walking; therefore, it may be best to start them with seated exercises. Also, balance may be compromised, so machine weights are recommended for resistance exercises.

Clients with frailty or sarcopenia may have trouble with toe clearance when walking; therefore, it may be best to start them with seated exercises.

Bone Health & Osteoporosis

Osteoporosis is defined as porous bone, which occurs when the body loses too much bone, does not produce enough bone, or experiences a combination of these.

Currently, about 10 million U.S. women and men have osteoporosis, and another 44 million have low bone density (osteopenia), placing them at increased risk of the disease. Studies suggest that 1 in 2 women and 1 in 4 men over the age of 50 will break a bone because of osteoporosis (NOF 2018).

THE DEVELOPMENT OF OSTEOPOROSIS

Bone is a dynamic tissue that is continually being remodeled in the adult body through the work of **osteoblasts,** bone cells responsible for bone formation, and **osteoclasts,** cells that "oversee" bone resorption, or breakdown. Osteoblasts lay down (deposit) a matrix of collagen and calcium phosphate to allow bone to be flexible yet strong, so it can withstand external forces.

Earlier in life, bone formation surpasses resorption, helping to build strong, dense bones up until the age of peak bone mass (around 30 years). Following peak bone mass, resorption gradually overtakes formation, and this process is accelerated for women during the menopausal transition. Osteoporosis is more likely to occur in a man or woman who did not reach optimal peak bone mass.

If we take a close look at bone, it has a honeycomb appearance. When osteoporosis occurs, the holes in the honeycomb become larger and the bone becomes less dense. As bone gets more porous, it becomes more fragile, making it susceptible to fractures from falls or even a hug. The hip, spine and wrist are the most common sites of osteoporotic fractures, but other bones can be affected as well.

EXERCISE FOR BONE HEALTH

Exercise is recommended to prevent and treat osteoporosis, as bone is responsive to mechanical loading, both through muscle

Frailty and the Older Adult

When working with older adults, fitness professionals must be aware of the issue of frailty. It is estimated that 25%–50% of individuals over the age of 85 are frail.

One reason the estimate spans such a wide range is because researchers lack a standardized definition for the term. **Frailty** has been defined as everything from a sign of advancing age to a disability to a clinical syndrome in which three or more of the following criteria are present:

- unintentional weight loss (10 pounds or more in the past year)
- self-reported exhaustion
- weakness
- slow walking speed
- low physical activity

Frailty can affect anyone, but its occurrence increases with age, and it appears to be more common in women than in men and more prevalent in people with lower education and income levels, poorer health, and higher rates of comorbid chronic disease and disability (Clegg et al. 2013; Collard et al. 2012; Franse et al. 2017).

forces and through ground reaction forces (Yokota, Leong & Sun 2011). While the *exact* exercise design needed to stimulate optimal skeletal adaptations has yet to be determined, we do know that the effects of exercise on bone depend on modality, dose and intensity.

Research suggests that not all exercise is equal when it comes to improving bone health. For example, while walking is a wonderful exercise for aerobic fitness, cardiometabolic factors and weight loss, a meta-analysis revealed minimal or no effect on bone in peri- and postmenopausal women who walked regularly (Ma, Wu & He 2013). In addition, as mentioned earlier, walking can pose a fall risk for older adults with frailty, which can further increase fracture risk.

It is important to note that it is never too late to start a bone-protecting program, as exercise training may prevent fractures even when started after menopause (Kemmler et al. 2015). Exercise modes found to promote bone growth include certain forms of weight-bearing impact exercise and resistance training.

Research has shown enhanced bone production in older adults who participated in exercise that involved moderate- to high-impact weight-bearing moves (loads that were more than double the person's body weight) and was applied in a progressive, novel and multidirectional way (Vainionpaa et al. 2006; Allison et al. 2013). To achieve maximum benefit from resistance training, the activity should be progressively increased over time, have a high magnitude of loading (~80%–85% of one-repetition maximum) and be performed at least twice per week (Zhao, Zhao, & Xu 2015; Kerr et al. 1996).

EXERCISE SAFETY WITH OSTEOPOROSIS

While the previously mentioned exercise modalities have proven effective at building bone, that does not mean they are always safe for older adults who have already been diagnosed with osteopenia or osteoporosis. For individuals with osteoporosis, exercise precautions include avoiding loaded forward flexion and rotation of the spine. Activities that carry an increased risk of falling should be avoided or used with extreme caution. Exercises that require sudden, forceful movement should also be avoided unless introduced gradually as part of a progressive program.

Cardiovascular Health & CVD

Cardiovascular disease (CVD) is the number-one killer of men and women over the age of 65 in the United States. More than 1 in 3 American adults have one or more types of CVD. Of these individuals, 46.7 million are estimated to be 60 years of age or older (AHA 2017b).

THE DEVELOPMENT OF CVD

There are many types of **cardiovascular disease**, which can be defined as conditions that affect the structure or function of the heart and blood vessels. A few of the most common types of CVD include coronary artery disease (narrowing of the arteries in the heart), myocardial infarction (heart attack), stroke (a blocked or burst blood vessel in the brain), and arrhythmias (abnormal heart rhythms).

The causes of each type of CVD differ, but the most common are atherosclerosis (fatty deposits in the arteries) and damage to the circulatory system as a result of another health condition, such as diabetes and hypertension (high blood pressure).

Atherosclerosis occurs when fatty deposits, or plaque, accumulate in the arteries. **Plaque** is a waxy substance made up of cholesterol, fatty molecules and minerals. The progressive buildup of plaque thickens and stiffens artery walls, and this can impede blood flow to organs and tissues, including the heart, thereby inhibiting delivery of vital nutrients and oxygen.

Hypertension, hyperlipidemia (a high

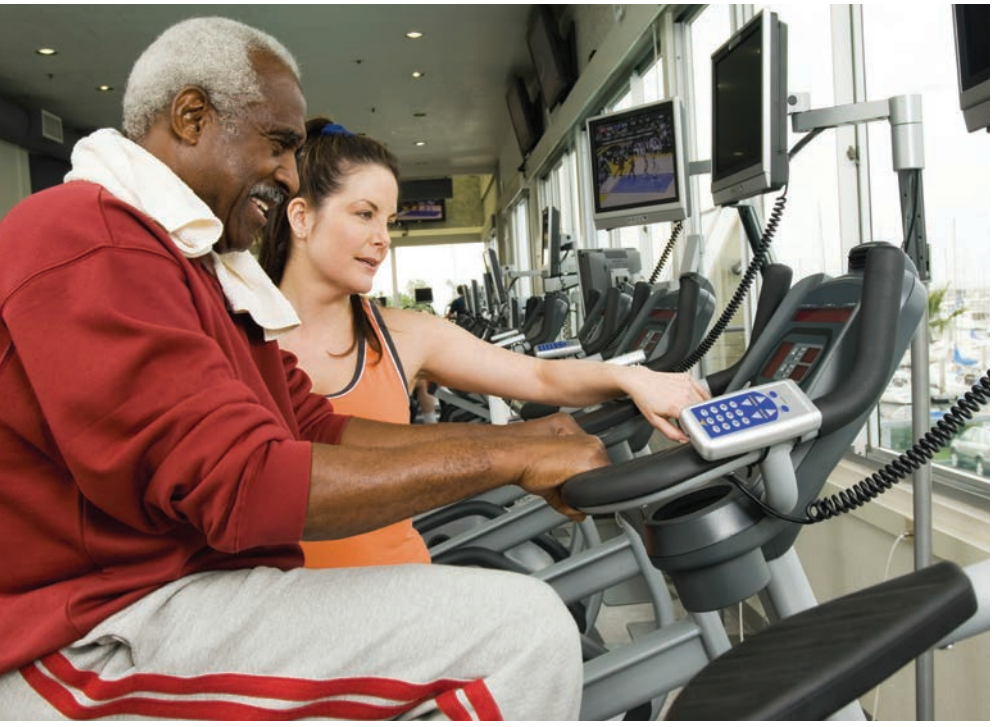
level of blood fats), diabetes, smoking, obesity, physical inactivity and poor nutritional habits all contribute to an increased risk of developing CVD.

EXERCISE FOR CARDIOVASCULAR HEALTH

The benefits of exercise training on CVD have been known since the 1950s, when Morris and Crawford (1958) found lower rates of coronary heart disease among people with active occupations versus sedentary jobs. Consistent training improves the CVD risk profile by lowering blood pressure, reducing triglycerides and increasing HDL (good) cholesterol, improving glucose metabolism and insulin sensitivity, and decreasing body weight (Whelton et al. 2002; Mann, Beedie & Jimenez 2014; Thomas, Elliott & Naughton 2006).

Additional improvements in risk profiles may result from enhanced vagal tone (a biological process that refers to activity of the vagus nerve), leading to lower heart rates; vascular remodeling, including enlargement of blood vessel diameters; and improved endothelial function (Beere, Glagov & Zarins 1992; Joyner & Green 2009). The American Heart Association (2017a) suggests that to improve overall cardiovascular health, one should participate in at least 150 minutes per week of moderate exercise or 75 minutes per week of vigorous exercise (or a combination of moderate and vigorous activity). These recommendations stem from research indicating that CVD mortality gradually declines with increasing levels of moderate-intensity physical activity; interestingly, vigorous intensity affords no additional benefits over moderate intensity (Wen et al. 2011; Lee et al. 2014).

Adding strength training to aerobic programs is also recommended, as research has shown that this combination tends to produce larger increases in cardiopulmonary fitness and improvements in quality of life for individuals with CVD (Marzolini, Oh & Brooks 2012).



EXERCISE SAFETY WITH CARDIOVASCULAR DISEASE

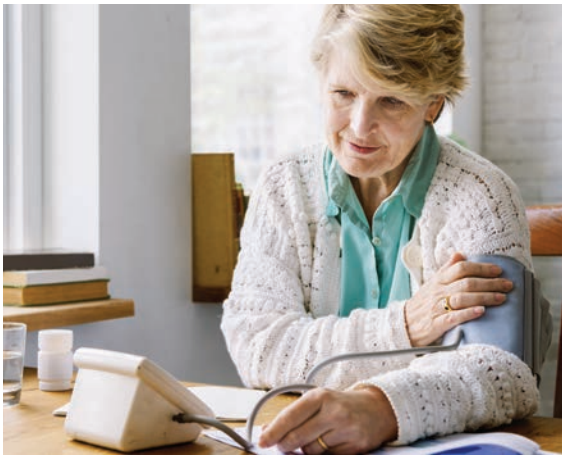
If clients experience chest pressure or pain in the chest, neck, arm, jaw or shoulder, immediately stop exercising and call 911. Exercise should also be halted if a client with CVD becomes overly fatigued or experiences unusual shortness of breath.

Clients with hypertension should monitor their blood pressure before, during and after exercise. Exercise should stop immediately if their blood pressure reaches approximately 240/115 mm HG.

When clients perform resistance training, they should avoid significant isometric segments, as these may trigger a dramatic rise in blood pressure. Clients taking antihypertensive medications should transition slowly when getting up from the floor because they will be more susceptible to **orthostatic hypotension,** a rapid drop in blood pressure that can happen when a person moves quickly from a seated/supine position to standing.

Blood Sugar & Type 2 Diabetes

The incidence of diabetes has been steadily increasing in the United States, and currently more than 100 million individuals have either diabetes or prediabetes. Older adults are at greatest risk, with an estimated 25% of people over age 65 having diabetes



and an additional 48% having prediabetes. The majority of cases (90%–95%) are type 2 diabetes (CDC 2017).

THE DEVELOPMENT OF TYPE 2 DIABETES

Diabetes is a metabolic disorder that impairs the body's ability to either produce or effectively use **insulin,** a key hormone for moving glucose from the bloodstream to the body's cells. When everything is working as it should, the pancreas produces enough insulin (but not too much), and the hormone effectively facilitates the movement of glucose into the cells, where it is used to create energy.

Insulin resistance happens when defects in the insulin receptors on the body's cells fail to unlock the cells to allow glucose to enter, resulting in a buildup of glucose in the bloodstream. This causes the pancreas to produce more and more insulin to try and move the glucose into the cells. After a while, the islet cells of the pancreas (which produce the insulin) become overworked, and insulin production slows, resulting in an increase in glucose in the bloodstream.

Older adults are at high risk of developing type 2 diabetes, owing to the combined effects of insulin resistance and compromised pancreatic function. Age-related insulin resistance appears to be associated primarily with obesity, sarcopenia and physical inactivity (Amati et al. 2009).

Note: In type 1 diabetes, which accounts for only about 5% of all diabetes cases, the insulin-making cells in the pancreas have been destroyed, so insulin therapy must be used every day. Type 1 has different causes from type 2 and is generally not associated with obesity or inactivity. Fitness professionals working with people who have type 1 diabetes should strive to learn more about this very different form of the condition.

EXERCISE FOR BETTER BLOOD SUGAR

Along with medication and nutrition, exercise has long been a foundational practice in the treatment of type 2 diabetes. Research has shown that both aerobic activity and resistance training are effective in lowering weight, which in turn reduces insulin resistance (Ross et al. 2000).

Exercise reduces blood sugar levels by assisting glucose uptake by skeletal muscles via the glucose transport protein called **GLUT4**. In type 2 diabetes, deficiencies in the insulin receptors impair glucose uptake and GLUT4 translocation. Regular exercise can help combat insulin deficiencies by providing GLUT4 translocation.

This benefit can be seen in research conducted by DiPietro et al. (2013), who observed a greater improvement in blood glucose on days when older adults with diabetes walked for 15 minutes after each meal (breakfast, lunch and dinner, total 45 minutes) than on days when they walked for 45 minutes consecutively. In fact, in 2016, the American Diabetes Association updated its guidelines for physical activity and exercise for people with diabetes, recommending less overall sedentary time every day; the most notable change calls for 3 or more minutes of light activity every 30 minutes during prolonged sedentary periods (ADA 2016).

EXERCISE SAFETY WITH TYPE 2 DIABETES

Older adults with diabetes should be

> Research suggests that cardiovascular disease mortality gradually declines with increasing levels of moderate-intensity physical activity.

Earn Bonus Points for Studying Seniors

One of the greatest things about training seniors is their flexible schedules! As retirees, they can be the perfect fit for those open spots in your calendar, whether you're a group ex instructor or a personal trainer (or both). Here are three ways to grow what you know, while earning CEUs in the process:

AFAA'S EXERCISE DESIGN FOR SENIORS
Pinpoint the needs of class participants by learning how to modify specific exercises for older adults with osteoarthritis, hypertension, type 2 diabetes and/or osteoporosis.
7 AFAA CEUs; afaa.com/courses/exercise-design-for-seniors.

AFAA'S GOLDEN HEARTS: SENIOR FITNESS TRAINING
Learn more about the physiological changes that occur naturally with aging, as well as the chronic diseases older adults often face. Also learn tips for getting the sedentary up and moving.
7 AFAA CEUs; afaa.com/courses/golden-hearts-senior-fitness-training.

NASM'S SENIOR FITNESS SPECIALIZATION
Build credibility with your older adult clients: This course delivers the how-tos for designing programs for older adults based on the safe progression in NASM's Optimum Performance Training™ model.
1.0 NASM CEU; nasm.org/products/CEU140K.

encouraged to participate in aerobic, strength, flexibility and balance activities. If individuals have type 2 diabetes, they are most likely overweight and sedentary; therefore, their program should start slowly and progress slowly.

It is important for older adults with diabetes to track their blood glucose levels before, during and after exercise, to avoid hypoglycemia (a dangerous drop in blood sugar). Clients should have a quickly absorbable carbohydrate on hand to provide glucose to the bloodstream in case of hypoglycemia.

To prevent hypoglycemia, a client who injects insulin should avoid exercising when the effect of the insulin injection is peaking. Time to peak action is determined by the type of insulin used; therefore, it is important to discuss the drug's action with the client to determine the best time to exercise. Other safety concerns may include exercising in extreme hot or cold if the client experiences autonomic neuropathy (which affects the body's ability to regulate temperature), and strenuous upper-extremity exercise if the client is at risk for retinopathy (nerve damage to the eyes). Because many people with type 2 diabetes develop peripheral neuropathy (nerve damage to the extremities), clients should talk with their doctor about how to prevent and treat foot ulcers and other foot problems.

Brain Health & Alzheimer's Disease

Alzheimer's disease is the most common form of dementia, a progressive and irreversible neurodegenerative disease. It is estimated that 5.7 million Americans are living with Alzheimer's disease, and 96% of them are over the age of 65 years. This disease is the fifth leading cause of death in older adults (AA 2018).

THE DEVELOPMENT OF ALZHEIMER'S DISEASE

Researchers are working to understand the brain changes involved in the onset and progression of Alzheimer's disease. These changes may start to occur decades before symptoms like memory loss appear (AA 2018; NIA 2018a). Cognitive symptoms—such as confusion, disorientation, and impairments to memory, thinking and language—usually develop slowly, gradually worsening over time (NIA 2018a).

One of the first things that occur in the development of Alzheimer's disease is a progressive loss of **neurons** (specialized cells that process and transmit information via chemical and electrical signals) in certain areas of the brain, such as the entorhinal cortex and the hippocampus, both of which support memory. As the disease progresses, neurons are also lost within the cerebral cortex, which is responsible for language, reasoning and social behavior (NIA 2018b). Hallmark signs of Alzheimer's disease—and the prime suspects in cell death and brain tissue loss—are accumulations of amyloid plaques and neurofibrillary tangles.

Amyloid plaques form when pieces of the protein beta-amyloid bunch together between neurons. These bunches may block cell-to-cell communication and prompt the immune system to trigger an inflammatory response.

Neurofibrillary tangles are abnormal accumulations of a protein called tau that collect inside neurons. Tau forms part of a structure called a **microtubule** within the neuron. In a healthy brain, the microtubule helps to transport nutrients and other important substances from one part of the nerve cell to another. In the brain affected by Alzheimer's disease, there is an abnormal chemical change in tau that causes it to detach from the microtubule and stick to other tau molecules, forming tangles within the neuron. As a result, the microtubule structures collapse, disrupting communication between neurons and leading to cell death (Binder et al. 2005).

Researchers are also interested in the **inflammatory response** and its link to Alzheimer's disease. **Microglial cells** are key cells of the immune system in the brain. These cells, along with **astrocytes** (another

It is important for older adults with diabetes to track their blood glucose levels before, during and after exercise, to avoid hypoglycemia.

type of glial cell), play the role of cerebral macrophages, which means they surround and kill harmful microorganisms, ingest foreign material, remove dead cells and boost immune responses. In Alzheimer's disease, microglia and astrocytes fail to do their job; they accumulate around neurons, releasing chemicals that kill the neurons or cause chronic inflammation and further damage (Blasko et al. 2004).

All of these structural changes within the brain lead to functional deviations. During the early stages of Alzheimer's, individuals may experience issues with memory or concentration. As more damage occurs in the brain, they may enter the longest stage of the disease—the middle stage—and have difficulty expressing thoughts and completing routine tasks. In the final stage, people lose the ability to respond to their surroundings, to carry on a conversation and, ultimately, to control movement (NIA 2018a).

EXERCISE FOR BRAIN HEALTH

From research, we understand that the risk for brain dysfunction and Alzheimer's disease is increased by obesity, diabetes, hypertension, hypercholesterolemia and chronic inflammation (Morris et al. 2014). We also know that exercise helps to control these conditions, while reducing the risk of Alzheimer's disease (Scarmeas et al. 2009).

Alzheimer's disease researchers are still working to determine exactly how exercise affects the brain. Animal studies have shown aerobic exercise to be a promising approach for counteracting hippocampal damage and cognitive deficits caused by Alzheimer's disease. Exercise appears to stimulate growth factors that promote **neurogenesis,** the formation of new neurons (Intlekofer & Cotman 2013).

Most of the research supporting a relationship between exercise and brain health has looked at aerobic exercise. A recent meta-analysis of 19 research studies on humans determined that aerobic exercise training may postpone the decline in cognitive function that occurs in individuals who are at risk of or have Alzheimer's disease (Panza et al. 2018).

Little data exists on the role of resistance exercise in promoting brain health; however, a few studies do show promising results. Liu-Ambrose et al. (2010) found that resistance training benefited the executive cognitive functions of selective attention and conflict resolution among older women. Nagamatsu et al. (2012) found that resistance training was associated with modest cognitive benefits in study participants with cognitive impairment. That said, much more research is needed in this area before the appropriate resistance exercise design for individuals with Alzheimer's disease can be determined.

EXERCISE SAFETY WITH ALZHEIMER'S DISEASE

When working with a client who has Alzheimer's disease, the focus should be on aerobic-type activities that are familiar to the individual. The program should start off slowly and progress slowly. Fitness professionals should keep in mind that what clients can accomplish on one day may be very different from what they can accomplish on another day.

Since these clients may have difficulty with balance, owing to changes in visual perception and coordination, adding in neuromotor control activities is suggested. The workout area needs to be clutter-free and well-lit, with minimal peripheral movement and noise, as these can be disconcerting to the clients.

Any new skills, such as resistance training, will require specific instructions and repetition. Cues should communicate only one instruction at a time. Machine weights are safer than free weights, because the latter can be dropped.

The Rewards of Training Older Clients

Specific exercise recommendations for each older adult client will depend on his or her baseline fitness and existing comorbidities. It is therefore vital to perform an initial assessment and then assess often on an ongoing basis.

Individual clients may have multiple physical limitations and/or comorbidities. Fitness professionals should ensure that, after a client is cleared to exercise, the healthcare team continues to provide specific input to help with adjusting the training program as needed.

While these factors may add a challenge to working with older adults, the benefits are proven, positive and rewarding. Fitness programming can enhance functional and cognitive abilities, increase glucose control, reduce CVD risk, and possibly stabilize bone loss. If improving others' quality of life is among your most compelling career objectives, this demographic may be a perfect fit for you.

JAN SCHROEDER, PHD, *is chair of the Department of Kinesiology at Long Beach State University, where she teaches fitness. She has written more than 60 articles on exercise physiology/fitness and teaches group exercise as an AFAA-certified instructor.*

While the *exact* exercise design needed to stimulate optimal skeletal adaptations has yet to be determined, we do know that the effects of exercise on bone depend on modality, dose and intensity.

REFERENCES

AA (Alzheimer's Association). 2018. 2018 Alzheimer's disease facts and figures. Accessed July 22, 2018: www.alz.org/media/HomeOffice/Facts%20and%20Figures/facts-and-figures.pdf.

Aagaard, P., et al. 2010. Role of the nervous system in sarcopenia and muscle atrophy with aging: Strength training as a countermeasure. *Scandinavian Journal of Medicine & Science in Sports, 20* (1), 49–64.

ADA (American Diabetes Association). 2016. American Diabetes Association issues new recommendations on physical activity and exercise for people with diabetes. Accessed July 22, 2018: diabetes.org/newsroom/press-releases/2016/ada-issues-new-recommendations-on-physical-activity-and-exercise.html.

AHA (American Heart Association). 2017a. American Heart Association recommendations for physical activity in adults. Accessed July 22, 2018: heart.org/HEARTORG/HealthyLiving/PhysicalActivity/FitnessBasics/American-Heart-Association-Recommendations-for-Physical-Activity-in-Adults_UCM_307976_Article.jsp#.WymILUcTYnI.

AHA. 2017b. Heart disease and stroke statistics—2017 update. Accessed July 22, 2018: ncbi.nlm.nih.gov/pmc/articles/PMC5408160/.

Allison, S.J., et al. 2013. High impact exercise increased femoral neck bone mineral density in older men: A randomised unilateral intervention. *Bone, 53* (2), 321–28.

Amati, F., et al. 2009. Physical inactivity and obesity underlie the insulin resistance of aging. *Diabetes Care, 32* (8), 1547–49.

Bassey, E.J., et al. 1992. Leg extensor power and functional performance in very old men and women. *Clinical Science, 82* (3), 321–27.

Beere, P.A., Glagov, S., & Zarins, C.K. 1992. Experimental atherosclerosis at the carotid bifurcation of the cynomolgus monkey. Localization, compensatory enlargement, and the sparing effect of lowered heart rate. *Arteriosclerosis, Thrombosis, and Vascular Biology, 12* (11), 1245–53.

Beijersbergen, C.M.I., et al. 2013. The biomechanical mechanism of how strength and power training improves walking speed in old adults remains unknown. *Ageing Research Reviews, 12* (2), 618–27.

Binder, L.I., et al. 2005. Tau, tangles, and Alzheimer's disease. *Biochimica et Biophysica Acta, 1739* (2–3), 216–23.

Blasko, I., et al. 2004. How chronic inflammation can affect the brain and support the development of Alzheimer's disease in old age: The role of microglia and astrocytes. *Aging Cell, 3* (4), 169–76.

CDC (Centers for Disease Control and Prevention). 2017. *National Diabetes Statistics Report, 2017*. Accessed July 22, 2018: diabetes.org/assets/pdfs/basics/cdc-statistics-report-2017.pdf.

Clegg, A., et al. 2013. Frailty in elderly people. *Lancet, 381* (9868), 752–62.

Collard, R.M., et al. 2012. Prevalence of frailty in community-dwelling older persons: A systematic review. *Journal of the American Geriatrics Society, 60* (8), 1487–92.

de Vries, N.M., et al. 2012. Effects of physical exercise therapy on mobility, physical functioning, physical activity and quality of life in community-dwelling older adults with impaired mobility, physical disability and/or multi-morbidity: A meta-analysis. *Ageing Research Reviews, 11* (1), 136–49.

DiPietro, L., et al. 2013. Three 15-min bouts of moderate postmeal walking significantly improves 24-h glycemic control in older people at risk for impaired glucose tolerance. *Diabetes Care, 36* (10), 3262–68.

Franse, C.B., et al. 2017. Socioeconomic inequalities in frailty and frailty components among community-dwelling older citizens. *PLOS ONE, 12* (11).

Intlekofer, K.A., & Cotman, C.W. 2013. Exercise counteracts declining hippocampal function in aging and Alzheimer's disease. *Neurobiology of Disease, 57*, 47–55.

Joyner, M.J., & Green, D.J. 2009. Exercise protects the cardiovascular system: Effects beyond traditional risk factors. *Journal of Physiology, 587* (23), 5551–58.

Kemmler, W., et al. 2015. Exercise and fractures in postmenopausal women. Final results of the controlled Erlangen Fitness and Osteoporosis Prevention Study (EFOPS). *Osteoporosis International, 26* (10), 2491–99.

Kerr, D., et al. 1996. Exercise effects on bone mass in postmenopausal women are site-specific and load-dependent. *Journal of Bone and Mineral Research, 11* (2), 218–25.

Landi, F., et al. 2012. Sarcopenia as a risk factor for falls in elderly individuals: Results from the ilSIRENTE study. *Clinical Nutrition, 5* (31), 652–58.

Landi, F., et al. 2014. Exercise as a remedy for sarcopenia. *Current Opinion in Clinical Nutrition and Metabolic Care, 17* (1), 25–31.

Lee, D.C., et al. 2014. Leisure-time running reduces all-cause and cardiovascular mortality risk. *Journal of American College of Cardiology, 64* (5), 472–81.

Lexell, J. 1995. Human aging, muscle mass, and fiber type composition. *The Journals of Gerontology. Series A, Biological Sciences and Medical Sciences, 50* (Spec No:11–16).

Liu-Ambrose, T., et al. 2010. Resistance training and executive functions: A 12-month randomized controlled trial. *Archives of Internal Medicine, 170* (2), 170–78.

Ma, D., Wu, L., & He, Z. 2013. Effects of walking on the preservation of bone mineral density in perimenopausal and postmenopausal women: A systematic review and meta-analysis. *Menopause, 20* (11), 1216–26.

Mann S., Beedie C., & Jimenez A. 2014. Differential effects of aerobic exercise, resistance training and combined exercise modalities on cholesterol and the lipid profile: Review, synthesis and recommendations. *Sports Medicine, 44* (2), 211–21.

Marzolini, S., Oh, P.I., & Brooks, D. 2012. Effect of combined aerobic and resistance training versus aerobic training alone in individuals with coronary artery disease: A meta-analysis. *European Journal of Preventative Cardiology, 19* (1), 81–94.

Metter, E.J., et al. 1997. Age-associated loss of power and strength in the upper extremities in women and men. *The Journals of Gerontology. Series A, Biological Sciences and* Medical *Sciences, 52* (5), B267–76.

Miszko, T.A., et al. 2003. Effect of strength and power training on physical function in community-dwelling older adults. *The Journals of Gerontology. Series A, Biological Sciences and Medical Sciences, 58* (2), 171–75.

Morris, J.K., et al. 2014. Is Alzheimer's disease a systemic disease? *Biochimica et Biophysica Acta, 1842* (9), 1340–49.

Morris, J.N., & Crawford, M.D. 1958. Coronary heart disease and physical activity of work. *British Journal of Medicine, 2* (5111), 1485–96.

Nagamatsu, L.S., et al. 2012. Resistance training promotes cognitive and functional brain plasticity in seniors with probable mild cognitive impairment: A 6-month randomized controlled trial. *Archives of Internal Medicine, 172* (8), 666–68.

NIA (National Institute on Aging). 2018a. What are the signs of Alzheimer's disease? Accessed July 22, 2018: nia.nih.gov/health/what-are-signs-alzheimers-disease.

NIA. 2018b. What happens to the brain in Alzheimer's disease? Accessed July 22, 2018: nia.nih.gov/health/what-happens-brain-alzheimers-disease.

NOF (National Osteoporosis Foundation). 2018. Bone health basics: Get the facts. Accessed July 22, 2018: nof.org/preventing-fractures/general-facts/.

Newman, A.B., et al. 2006. Strength, but not muscle mass, is associated with mortality in the health, aging and body composition study cohort. *The Journals of Gerontology. Series A, Biological Sciences and Medical Sciences, 61* (1), 72–77.

Panza, G.A., et al. 2018. Can exercise improve cognitive symptoms of Alzheimer's disease? *Journal of American Geriatrics Society, 66* (3), 487–95.

Peng, P., et al. 2012. Impact of sarcopenia on outcomes following resection of pancreatic adenocarcinoma. *Journal of Gastrointestinal Surgery, 16* (8), 1478–86.

Ross, R., et al. 2000. Reduction in obesity and related comorbid conditions after diet-induced weight loss or exercise-induced weight loss in men: A randomized, controlled trial. *Annals of Internal Medicine, 133* (2), 92–103.

Scarmeas, N., et al. 2009. Physical activity, diet, and risk of Alzheimer disease. *Journal of the American Medical Association, 302* (6), 627–37.

Schroeder, J., & Donlin, A. 2013. 2013 IDEA Fitness Programs & Equipment Trends report. *IDEA Fitness Journal, 10* (6), 34–45.

Snijders, T., Verdijk, L.B., & van Loon, L.J. 2009. The impact of sarcopenia and exercise training on skeletal muscle satellite cells. *Ageing Research Reviews, 8* (4), 328–38.

Theou, O., et al. 2011. The effectiveness of exercise interventions for the management of frailty: A systematic review. *Journal of Aging Research*, 569194. doi:10.4061/2011/569194.

Thomas, D.E., Elliott, E.J., & Naughton, G.A. 2006. Exercise for type 2 diabetes mellitus. *Cochrane Database of Systematic Reviews, 3*, CD002968.

Timmerman, K.L., et al. 2012. A moderate acute increase in physical activity enhances nutritive flow and the muscle protein anabolic response to mixed nutrient intake in older adults. *The American Journal of Clinical Nutrition, 95* (6), 1403–12.

Vainionpaa, A., et al. 2006. Intensity of exercise is associated with bone density change in premenopausal women. *Osteoporosis International, 17* (3), 455–63.

Wen, C.P., et al. 2011. Minimum amount of physical activity for reduced mortality and extended life expectancy: A prospective cohort study. *Lancet, 378* (9798), 1244–53.

Whelton, S.P., et al. 2002. Effect of aerobic exercise on blood pressure: A meta-analysis of randomized, controlled trials. *Annuals of Internal Medicine, 136* (7), 493–503.

Yokota, H., Leong, D.J., & Sun, H.B., 2011. Mechanical loading: Bone remodeling and cartilage maintenance. *Current Osteoporosis Reports, 9* (4), 237–42.

Zhao, R., Zhao, M., & Xu, Z. 2015. The effects of differing resistance training modes on the preservation of bone mineral density in postmenopausal women: A meta-analysis. *Osteoporosis International, 26* (5), 1605–18.

CEU test continued on page 28

Fit Bodies, Inc.

OUT OF THE GYM AND ONTO THE BEACH

General Group Exercise • Yoga • Dance Fitness • Pilates • Aqua Fit
Personal Training • Tennis • Golf • DJs

Fit Bodies, Inc. program is perfect for teaching professionals to share fitness, yoga or sports instruction with resort guests from all over the world.
Instructors see new destinations, teach on gorgeous beaches, meet special people and share the vacation experience with included companions.
All with light teaching schedules and luxury, all-inclusive resorts as travel options.
Travel a little, or travel a lot. Many positions available. Introducing cruise options!

Learn more at FitBodiesInc.com

Step 1
Member accounts and resort positions are on **FitnessProTravel.com**. Instructors complete a free member profile to begin in the program.

Step 2
Members view openings & secure travel selections online. Travel a little, or travel a lot. Search by date, country, or teaching format. Fit Bodies staff is happy to assist.

Step 3
Members secure dates online. Reservation confirmations are swift from Fit Bodies, Inc. no matter how far out an instructor books travel. Welcome to the program!

@fitbodiesinc

info@fitbodiesinc.com
1-800-599-9316

CEU QUIZ: WORKING WITH OLDER ADULTS
Health Challenges That Exercise Can Help

LEARNING OUTCOMES: After reading this article, you will be able to:

- Define the basic physiology of frailty and sarcopenia, osteoporosis, cardiovascular disease, type 2 diabetes, and Alzheimer's disease.
- Understand current research on prevention and management of frailty and sarcopenia, osteoporosis, cardiovascular disease, type 2 diabetes, and Alzheimer's disease.
- Describe the effects of an exercise program on individuals with frailty and sarcopenia, osteoporosis, cardiovascular disease, type 2 diabetes, and Alzheimer's disease.
- Discuss safety considerations for creating exercise programming for individuals with frailty and sarcopenia, osteoporosis, cardiovascular disease, type 2 diabetes, and Alzheimer's disease.

1. A loss of muscle mass is defined as _____.

a. osteopenia
b. musculopenia
c. sarcopenia
d. hypertrophy

2. As we age, we experience a/an _____ within our skeletal muscle.

a. increase in the satellite cell content
b. decrease in the number of muscle fibers
c. decrease in adipose tissue between the muscle fibers
d. increase in type II muscle fibers

3. Which exercise method has been shown to be most effective for enhancing physical function in older adults?

a. power training
b. cardiorespiratory training
c. slow-velocity resistance training
d. none of the above

4. Osteoblasts are _____.

a. responsible for regulating metabolic processes of bone
b. responsible for resorption of bone tissue
c. composed of calcium and phosphate salts
d. responsible for bone formation

5. Which exercise is *least* effective in improving bone density of the hip and spine?

a. dumbbell squats
b. box jumps
c. walking
d. jumping rope

6. Which type of exercise would be most applicable for older adults with osteoporosis?

a. activities with a risk of falling
b. non-weight-bearing activities
c. activities that stress the back
d. resistance training

7. The term *atherosclerosis* refers to which condition?

a. accumulation of fatty deposits in the arteries
b. abnormal heart rhythm
c. a blocked blood vessel
d. myocardial infarction

8. The American Heart Association suggests that to improve overall cardiovascular health, one should participate in at least _____ minutes of moderate-intensity exercise each week.

a. 75
b. 120
c. 150
d. 200

9. If a client has hypertension and his or her blood pressure reaches about _____ during exercise, the session should be stopped.

a. 120/80 mm Hg
b. 240/115 mm Hg
c. 200/100 mm Hg
d. 150/90 mm Hg

10. Diabetes is a metabolic disorder related to the production and transport of insulin, which is produced by the _____.

a. spleen
b. pancreas
c. liver
d. gall bladder

11. Exercise training can benefit a client with diabetes by _____.

a. lowering body fat
b. increasing sensitivity to insulin
c. improving GLUT4 translocation
d. all of the above

12. In 2016, the American Diabetes Association updated its guidelines on physical activity and exercise for people with diabetes. As an addition to other types of exercise, the ADA now recommends _____.

a. engaging in 3 or more minutes of light activity every 30 minutes during prolonged sedentary periods
b. being active for a 45-minute time period once per day
c. being active for a 45-minute time period every other day
d. engaging in light activity for no more than 3 minutes 3–5 times per day after meals and snacks

13. Alzheimer's disease causes all of the following changes to occur in the brain, *except* _____.

a. loss of neurons
b. accumulation of plaque
c. development of tangles
d. development of blood clots

14. Based on animal studies, which type of activity has shown promise in counteracting hippocampal damage and cognitive deficits caused by Alzheimer's disease?

a. aerobic training
b. resistance training
c. balance training
d. flexibility training

15. When training an individual with Alzheimer's disease, the fitness professional should focus on _____.

a. cuing only one instruction at a time
b. adding interest by offering multiple new activities at each session
c. resistance training with free weights
d. avoiding aerobic types of activities that increase heart rate

To earn 2 AFAA/0.2 NASM CEUs, purchase the CEU quiz ($35) and successfully complete it online at afaa.com.

YOU WON'T JUST BE A CERTIFIED *GROUP FITNESS INSTRUCTOR.*

YOU'LL BE A...

LEADER
MOTIVATOR
COACH
ROCK STAR
TRAILBLAZER
PIONEER
GUIDE
FRIEND
HERO
ROLE MODEL

Become a Group Fitness Instructor.

For over 30 years, AFAA has helped thousands of people just like you reach dreams they never thought possible. We have the experience, wisdom, and know-how to help you become a **Certified Group Fitness Instructor**. And not just a good one. But a great one. You'll get practical skills. Hands-on experience. And, a job guarantee.*

Nobody does Group Fitness better!

RECEIVE $50 OFF

GROUP FITNESS INSTRUCTOR COURSES.*

AFAA™
ATHLETICS AND FITNESS ASSOCIATION OF AMERICA

CALL (800) 446-2322 OR VISIT AFAA.COM/COURSES/GROUP-EX.
USE PROMO CODE: GFIFALL

*Terms and conditions apply. Offer cannot be combined with any other discount. Expires 12/30/2018.

BOUNDENER

Fitness industry social media influencer Kaisa Keranen (KaisaFit) pushes the programming envelope and promotes self-acceptance as the key ingredient to getting lasting results.

BY LAURA QUAGLIO

LESS GYM

Even in "still" photography shots, it's clear that Kaisa Keranen is always on the move. In fact, her feet are on the ground in only *one* of the six images that cycle on the homepage of her website, kaisafit.com. (And that's only because of the inherent danger of doing heavily weighted barbell lunges while airborne.)

It seems there's almost *always* air under at least one of Keranen's feet—whether she's executing a flawless toe-touch split on a tennis court or making a handstand more core-challenging by hooking a bright pink suspension band around her feet. Even on vacation in a hotel room in Peru this July, she demonstrated that plyometrics are far from off-limits outside the gym. Her workout included lunges from bed-top to floor and burpee-style pushup-kickbacks. Oh, and that Instagram post was uploaded just prior to a 5-day hike to Machu Picchu. Given Keranen's penchant for "making the world her gym," we can only imagine how creative she got with elements from the tropical mountain forest and that ancient center of Incan power.

continued on page 34

PHOTOGRAPH: CORY SORENSEN
HAIR AND MAKEUP: DONNA GAST

"YOUR HAPPINESS HAS NOTHING TO DO WITH THE WAY YOU LOOK, AND AS MUCH AS PEOPLE WILL DISAGREE WITH THIS STATEMENT, YOUR HEALTH CAN'T BE DEFINED BY THE WAY YOU LOOK, EITHER."

PHOTOGRAPH: CORY SORENSEN
HAIR AND MAKEUP: DONNA GAST

In Her Own Words

From Kaisa Keranen, MS, NASM-PES

ON EDUCATION: I have always been someone interested in higher education and being the best I can possibly be. As an athlete, you are used to testing your limits every single day, so when it came to my career, it really wasn't much different. The moment I stepped into this industry, I wanted to be one of the best, and I've worked my booty off ever since.

ON MOTIVATION: I *love* challenging myself and pushing the limits of what my body is capable of, and movement allows me to do that. I never walk into a workout thinking, "Let's hit it hard so I burn 500 calories today." Absolutely not. I think that's a really backwards way of approaching movement. In that sense, you are using movement as a form of punishment, and that's a really unhealthy approach to movement and the relationship you have with your body. We should be moving because we love ourselves and want to take care of these incredible bodies that we have.

ON EMPOWERMENT: To empower someone is to believe in someone, oftentimes before they believe in themselves. I think that the best thing you can do as a trainer is to give the power back to your clients. Allow them to understand that you may be "guiding" the workout, but in all reality, they are the ones in full control. Teach them how to be in tune enough with their body that they know their limits and boundaries. Training is about *empowering* people, and that has always been one of my main focuses.

ON COMMUNICATION (WITH HERSELF): I have hard days just like everyone else! The most important thing I have learned is to listen to my body and not just try to push through it. If I am more tired or drained than normal, I make it a point to give myself a lighter day. I have learned the hard way that overriding those signs will most often lead to injuries and/or illness. When I train, I have an inner dialogue going all the time, like, "Kaisa, this is easy, and you know it. Step your game up!" or "Kaisa, this workout is really draining, and you are exhausted. It's time to wrap it up."

The communication with myself is constantly happening, and I trust it.

AN OPEN LETTER TO FIT PROS: I AM MORE THAN MY BODY (AND SO ARE YOU)

I have been defined and labeled by my body my entire life. It was so disheartening to come into this industry and see how much people were doing that to themselves. It's so backwards to think that if you can change the way you look, you will live a happier life. Your happiness has nothing to do with the way you look, and as much as people will disagree with this statement, your health can't be defined by the way you look, either.

We are *all* built differently.

Health does not look a certain way.

All human beings are made differently.

I've been muscular since the moment I came out of the womb. No matter what I do, I won't be able to be tall and lean. And what's the sense in beating myself up about that?

I am not my body.

My body is this amazing vessel that I get to use to go through life, but I refuse to allow it to define me. I'm incredibly grateful for all that it does for me, and I do my best to take good care of it. But, at the end of the day, I am so much more than my body.

I am a strong-minded, compassionate, driven woman who wants to get the world moving.

You can define me by my actions and characteristics as a human being, but not by my body.

Kaisa Keranen

Her Peru post alone garnered Keranen more than half a million Instagram views, plus such positive commentary as "Her and her workouts rock!!!" and "Amazing skill!" These are sentiments echoed endlessly on her other social media channels, including Facebook, where followers have asked, "Anyone else wonder how she maintains that smile always?!" Keranen responds with motivational words and emojis: purple hearts, a biceps-curled arm and the like. But it's her own message about her Peru workout that perfectly captures this fitness phenom's philosophy:

"Having the BEST time . . . I am loving EVERY minute of it."

"IT BECAME MY MISSION TO HELP EDUCATE AND EMPOWER PEOPLE THAT THEY WERE FAR MORE THAN THEIR EXTERIOR, AND IT WAS TIME THEY STOPPED DEFINING THEMSELVES AS SUCH. HEALTH IS NOT A LOOK; IT'S A *FEELING.*"

At the Top and Still on the Move

It's no wonder that Kaisa Keranen feels at the top of her game. Today, she's a personal trainer, fitness educator and social media influencer. Her #JustMove campaign supports her mission in life: to make fitness accessible and fun for literally everyone (more on that later).

Keranen's story has enlivened the pages of *Vogue, Shape, SELF, Men's Fitness.com, Harper's Bazaar, Oxygen* and other respected printed and online publications. Greatist named her as one of the top fitness influencers, and she was a go-to trainer for Michelle Obama's "Let's Move!" fitness campaign. Her experience runs the gamut from coaching clients one-on-one to leading workouts for hundreds of people at fitness events. At this year's NASM Optima Conference, she will keynote on Saturday, Oct. 13 (see page 37). And every day, she spreads her irrepressible spirit by posting motivational tips and workouts for her Instagram fans—all 771,000+ of them.

As if all this were not enough, Keranen also has (perhaps inadvertently) become a fitness fashionista, with an impressive collection of athletic shoes and enough colorful sportswear to make any fit girl envious. But who can be envious, really, because Keranen herself is so utterly un-hateable?

Her success today, she says, is the result of a mindset shift she experienced years ago. "My life changed when I decided to work on the most important relationship I will ever have: The one with myself."

Off to a Rocky Start

Like many fitness professionals, Keranen began on the other side of coaching, as a student athlete.

"I've always had such a love for movement, sports and competition. I grew up playing every sport I could," says the Seattle native. "I did gymnastics, swim team, soccer, ballet—you name it, I did it. It was my survival mechanism." It also was a survival mechanism for her parents, who were eager to help their ever-moving child burn off some excess energy. "My love of movement was intense, to say the least."

Later, she turned to movement as a coping mechanism to get through some of life's inevitable challenges. "Whenever I felt like I needed a break from everything that was going on, I turned to sports. It grounded me," she says. "I think that's where my deep love and admiration for movement really started. When you feel like something got you through the hardest times in your life, you create a bond with it and are forever grateful for all that it did for you."

KERANEN'S "THE WORLD IS MY GYM" ATTITUDE ATTRACTS A WIDE RANGE OF PEOPLE WHO ARE INSPIRED BY HER ENERGY AND APPROACH.

By middle school, Keranen began narrowing her focus to soccer, along with track and field, the latter of which she continued throughout her college years at the University of Washington. "Initially, I went to college as a student athlete," she says. Though her major was sociology, much of her focus was on her sports performance. In some ways, that paid off: She placed sixth in her first-ever heptathlon in 2004–05, and her 2006–07 javelin throw bested her fellow Huskies' scores by 27 feet, even though she competed only once that season.

However, it came at a price: By the time Keranen crossed the stage as a graduate in 2008, she felt "really broken," both mentally and physically. "I was not very clear about what I wanted to do with my career," she admits. "And I was injured all 4 years in college because I trained with the 'no pain, no gain' mentality. After trashing my body, I was completely disconnected from myself."

Keranen felt she'd been robbed of achieving her full potential, and she saw that, in order to heal, she needed to learn more about her body. She would take her recovery into her own hands, educate herself, and empower herself to do what was best for her health.

Leaping Into Learning

Keranen turned to the National Academy of Sports Medicine for her training, earning her NASM-CPT (and later her NASM Performance Enhancement Specialization, too). "Several months into my studies, I was asked to teach a boot camp," she says. "In that moment, I fell in love with coaching and knew that I wanted to do this for the rest of my life."

Soon, Keranen enrolled in an internship at Seattle-

based ZUM Fitness, where she worked for several years as a trainer. "I set out to learn everything I could about the training world," she says. In 2015, 3 years after striking out on her own with her company KaisaFit, she earned a master's degree in sports performance and injury prevention.

KaisaFit is both the name of her business and the name of her unique method of movement. At its root is the idea that you don't necessarily need expensive equipment and accessories to get fit. "Moving is getting out there and doing anything you want to do," says Keranen. As her social media following blossomed, she realized that her quest to connect with herself had actually connected her to others, too. "We are so disconnected from ourselves, and I think movement is a really healing tool to create that connection again," she adds. Ultimately, however, she wants to get her followers to the point where they no longer need her. "My goal is to give someone the confidence to take care of themselves on their own—to believe that they are worth it and to teach them the tools necessary to move through this life without me," she says. "You have to be able to do things on your own, and it's my job to set you up for that success."

"AS TRAINERS, WE ONLY HAVE A CERTAIN NUMBER OF HOURS IN THE DAY TO WORK WITH PEOPLE, SO WHEN SOCIAL MEDIA CAME ALONG, I SAW IT AS AN OPPORTUNITY TO GROW THOSE HOURS."

A Beautiful Mission

Like most (if not all) fitness professionals, Keranen found that clients were constantly asking how they could change what their bodies looked like, but she was more interested in showing clients all of the amazing things their bodies could *do*. "It became my mission to help educate and empower people that they were far more than their exterior, and it was time they stopped defining themselves as such," she says. "Health is not a look; it's a *feeling*."

The former heptathlete also wanted to shift the focus—theirs and hers—away from traditional measures of performance. "Performance isn't about how hard you go in the gym," she says. "It's about how well-rounded your program is. Do you spend enough time on your preworkout, nutrition, mental game, recovery, etc.? Too many times, we're focused on what people are achieving in the gym rather than how they are taking care of themselves in order to perform and *feel* their best. Performance is much more well-rounded than we tend to believe, and I think it's an important aspect to start coaching."

Keranen began setting up opportunities for clients to experience how "incredible" their bodies were. "I wanted them to see that anything was possible if only they shifted their focus and started to believe," she says. "I asked them to set performance goals (rather than aesthetic goals), and I started to shift their perspective."

Organically, a three-pronged approach emerged: Educate, motivate, empower. In her words: "I had to *educate* clients that their bodies were so capable of achieving anything their heart desired, they just needed to be *motivated* to take steps in the right direction and *empowered* to believe they could—and that they would be supported and encouraged every step of the way!"

Making Training Accessible to All

As Keranen moved from athlete to student to trainer to fitspiration personality, she became painfully aware of another flaw in the traditional model of fitness training. "From my gym experience, it was obvious that unless you had a certain income level, you didn't have the luxury of personal training, and it really bothered me," she says. "I felt everyone deserved the opportunity to get guidance from a professional, so early on I made it my mission to bring personal training to the masses."

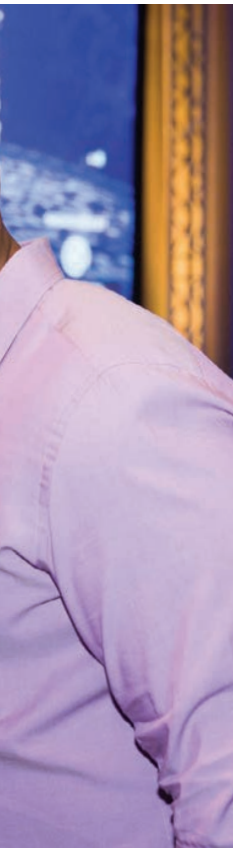
To that end, Keranen developed a style of small-group personal training called SMARTraining, or Specialized Movement for Accelerated Results Training, which she still offers on her website today. As she rose in social media status, she realized the powerful opportunity she had to share her message and get hundreds, then thousands, then hundreds of thousands, of people moving. It was both humbling and empowering for her.

"As trainers, we only have a certain number of hours in the day to work with people, so when social media came along, I saw it as an opportunity to grow those hours," she says. "I poured so much love into my page from the very beginning because I believed wholeheartedly in its power. *Should I spend some time creating a workout that I could share on Instagram and get 10 more people moving that day?!* Absolutely! My page was always rooted in that belief. From there, the rest is really history!"

In addition to her daily motivational social media posts, which include hundreds of free workout videos, Keranen offers a premium monthly membership to #TeamKaisa, which is for a "beginner/intermediate mover." This autumn, she will release an At Home program for all levels of fitness, and on the horizon is a line of KaisaFit products and apparel.

One thing's for sure: Keranen won't be resting on her laurels. One of her movement goals is "never to get bored," she says. "I pride myself on keeping my clients intrigued with movement and curious about what their bodies can achieve. I think there are really no limits to what the body is capable of, and my programs fully honor that. It's all one big challenge!"

Another thread throughout Keranen's posts is the backdrop: More often than not, it's shockingly non-gym-like. "I love making the *world* my gym," she says. "I think that there are so many opportunities to be inspired by what's around us."



KERANEN TAKES HER ROLE AS A POSITIVE ROLE MODEL AND SOCIAL MEDIA INFLUENCER TO HEART AND ENJOYS SHARING HER PASSION WITH OTHER FITNESS PROFESSIONALS, SUCH AS RAY BOYD, OWNER OF THE TRAINING FLOOR, STAMFORD, CONNECTICUT.

Kaisa Keranen's New Role: Keynote Speaker

JOIN HER AT THE NASM OPTIMA 2018 CONFERENCE IN SCOTTSDALE, ARIZONA, OCTOBER 11–14.

On Saturday, Oct. 13, at the NASM Optima 2018 Conference, Kaisa Keranen will take the stage as a keynote speaker. In her Instagram post on the subject, Keranen had this to say:

"I was asked by my NASM family to be one of the keynote speakers this year at the Optima conference, and I was floored, to say the least. When moments like this happen, I immediately go back to my first internship 8+ years ago, when I sat in a room with some of the smartest trainers and wondered how I was ever going to become even a fraction of who they were.

"Eventually I realized that my path to becoming the best trainer I could be was accepting that I would never be any of them. We're all different, and we each bring our own unique gifts to this industry (and this world). After years of beating myself up for not being as smart as those around me, I finally decided to take another approach. I started focusing on the things I was good at. Don't compare yourself to those around you. Have a dream and believe in your own unique gifts. If you can do that, your light will shine so bright that you [will] light up the world around you, and that is what this industry (and world) needs!"

The freedom of this also gets her creativity flowing, she admits, which keeps boredom at bay for her and her followers.

"I think my creativity with movement gives people freedom and encourages them to think outside the box," she reflects. "Our industry is pretty rigid in our definitions of what it means to exercise and be healthy, and I like to challenge that. If I can get the majority of the population up off the couch and moving around, I feel like I will have succeeded in my life's purpose."

It doesn't hurt, either, that fulfilling her life's purpose has made this ever-smiling athlete even happier (if that's possible).

"I never in a million years would have thought that life would take me to where I am today," she says. "But I am *so* incredibly thankful. At the end of the day, all anyone really needs is their body and the willingness to 'Just Move'!"

LAURA QUAGLIO *is a lifelong exercise enthusiast who has reaped many rewards but only ever won an under-the-hurdles race in elementary school. Thanks to Kaisa, she feels better about that now.*

GET IN FRONT OF HOLIDAY FITNESS AND WELLNESS HURDLES WITH THESE TOP TIPS FROM NASM MASTER TRAINERS.

BY CATHIE ERICSON

Prepare clients for the holi

days

Yes, it's almost that time again when we begin to eat, drink and be merry—maybe a little too much! And those in the fitness business know what that means: frustrated clients potentially falling off the healthy wagon. That "fall" doesn't wait until autumn is over, either: Halloween—with its glut of candy, whether left over or toted home by kids or to the office by co-workers—begins the avalanche of temptations. Afterward follows boulder after boulder of resolve-wrecking traditions, including pumpkin-flavored drinks and desserts, traditional Thanksgiving spreads (sometimes at more than one home!), the cookie exchanges and get-togethers of December, and the seemingly inevitable appetizers and cocktails of New Year's Eve. At the end, many clients find themselves many pounds heavier and feeling defeated before they even begin to tackle the twin New Year's resolutions to "eat better and exercise more."

Of course, as a fitness professional, you know it's easier to avoid gaining those holiday pounds than it is to lose them later. Secretly, your clients know it, too. What they don't know is how to address the mindsets and habits that lead them to overindulge year after year.

To help *you* help *them* stay on the healthy wagon—beginning with the season of haunted hayrides and continuing through the weeks of one-horse-open-sleigh rides—we asked NASM Master Trainers for their best advice. Here are the behavior modification techniques and practical tactics they suggest. (To learn how to become an NASM Master Trainer, see page 41.)

PART 1: THE MINDSETS THAT CAUSE TROUBLE

OVERLY AMBITIOUS WINTER GOALS

Timing plays a key role in helping new and existing clients achieve practical goals, and obviously the holidays are a time of high stress, which can derail the best of intentions if a client takes on too much too soon.

"Right before the holidays, we often see new clients who want to go from the couch to a full-fledged exercise program, as well as completely overhaul their diet," notes Kinsey Mahaffey, NASM Master Trainer and a health coach at The Train Station in Houston.

The problem, she says, is that they haven't stopped to think about the fact that they are in the middle of a busy season winding down the year at work, they have a houseful of distant relatives coming to visit, and they agreed to prepare a four-course meal for the holidays. Mahaffey recommends guiding clients toward a fall/winter action plan that is realistic and making a plan for progression once life calms down.

"Talk with clients about what is reasonable and possible *right now*, given the other demands on their time," she says. "Maybe it's as simple as committing to just showing up to one session per week, drinking an extra glass of water daily or devoting 10–15 minutes each day to a walk."

The idea is that if you help clients select one simple, doable task to focus on and have them report back on their progress, they are more likely to feel positive about the action they are taking and will be less likely to burn out.

HELPLESSNESS IN THE FACE OF TEMPTATION

Take time to help clients reframe their choices through a behavioral lens, starting with managing expectations, says Andrew Mills, NASM Master Trainer and president of Achieve Wellness in St. Louis.

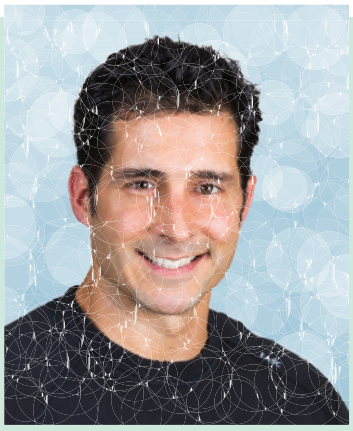
"People make logical decisions when they are calm, but when they are stressed, they inevitably become more emotional and impulsive," says Mills. He works with clients to help them identify their holiday-related stress trigger points so the clients aren't caught off guard.

"When you have thought through how you will respond to a situation if it arises, you have something to fall back on when you catch yourself in that phase," he points out. For example, maybe a client tends to scarf the leftover cake because she's annoyed to be cleaning the kitchen while everyone else lounges. One way to deal with this, says Mills, might be to "help [clients] pre-identify something they can set aside that's healthier to eat, so they are ready when this inevitable situation arises."

Emotional eating related to stress is just one challenge during the holidays. The other is that there's flat out *too much temptation,* and it's everywhere, points out Mahaffey—at the office, at family gatherings, at holiday parties and almost everywhere else you go. Action plans help with this, too. If a client's co-workers like to bring sweets to the break room, maybe the client will decide to take the longer route to the

The goal is to stay on your clients' radar throughout the busy holiday season so when your email or post shows up, it plants the seed to fit in a workout.

—Nino Magaddino, NASM Master Trainer



"Talk with [clients] about what is reasonable and possible right now, given the other demands on their time. Maybe it's as simple as . . . showing up to one session per week."

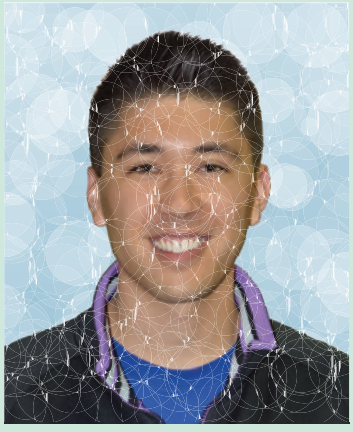
—Kinsey Mahaffey, NASM Master Trainer

"I help [clients] see that what they decide to eat has no bearing on the joy that everyone is getting from being together."

—Andrew Mills, NASM Master Trainer

"It can be helpful for [clients to meet in person or online] to discuss the similar challenges they are facing . . . during a tough time of year."

—Matt Boyer, NASM Master Trainer



copy machine so he doesn't see or smell the food, thereby bypassing the temptation.

Remember that a holiday plan of action can't be based on *complete* self-denial. Rather, encourage clients to be mindful about the choices they will make. "Have your client decide ahead of time what indulgences are 'worth it' during the holidays, whether it's the cake her mom only bakes once a year or a special chocolate treat she has on Christmas Day," says Mahaffey. "Then have her write down those choices as a reminder and something to look forward to."

A HOLIDAY FOCUS ON FUN, NOT FOOD

Most of us set future-oriented goals, such as "I want to run a marathon this spring" or "I want to lose 20 pounds." During the holidays, these dreams may fade into the distance as clients struggle to meet the more immediate demands of the season. So, Mills works with his clients to identify what he calls the "value-based behavior" that will help them move closer to their long-term goals and stay on track in the short term.

For example, if a client has the goal of losing weight but gets tripped up at big family meals, Mills has her focus on the values she is searching for when her family is in town. Examples might be building bonds by reminiscing, playing games, laughing together and creating new traditions.

"I help clients remember that what's important at a family gathering is the conversation and the enjoyment that comes from the company, not what everyone is eating," he says. "I help them see that what they decide to eat has no bearing on the joy that everyone is getting from being together."

You can even help your client develop a script for deftly sidestepping these situations; see "Assertiveness Training: Help Clients Avoid Giving In to Guilt" on page 44.

AN "ALL-OR-NOTHING" ATTITUDE

Inevitably, the best-laid plans get derailed—especially during the holidays when our schedules become overloaded. Often, this means exercise and nutrition take a back seat. Mahaffey swears by the Tiny Habits® concept pioneered by BJ Fogg, PhD, director of the Behavior Design Lab at Stanford University (tinyhabits.com).

The goal is to help clients adopt a new habit by breaking it down into smaller, more achievable steps. This tactic can also be used to help people sustain a habit when "life happens."

As an example, if you have a client who is committed to running three times a week but is constantly postponing his workouts, give him an alternative to skipping his run altogether. Help him think of the smallest version (or versions) of this habit that he could do—perhaps going for a 5- to 10-minute run or simply putting on his running shoes.

"This keeps the habit intact and helps keep healthy behaviors sustainable over time so they don't get dropped when life happens," explains Mahaffey.

PART 2: THE TACTICS THAT KEEP CLIENTS ON TRACK

HOLIDAY CONTESTS WITH DESIRABLE PRIZES

Mahaffey plans an annual "Holiday Hustle," a studiowide challenge to keep clients accountable during the holidays. Here's how it works:

First, Mahaffey asks participants to set a personal goal for how many days a week they would like to exercise. She

What It Takes to Be an NASM Master Trainer

Wondering how the experts featured in this article earned the designation of NASM Master Trainer? Here's the short answer:

Eligible candidates with a current NASM-CPT certification can work toward the title of NASM Master Trainer, which can be completed in as little as 1–2 years. To become an NASM Master Trainer, you must maintain your NASM-CPT certification and complete three NASM specializations (an approved college degree can replace one specialization). You must also successfully demonstrate your ability to apply real-life practical skills through an online course with video submissions, and then attend the culminating NASM Master Trainer Summit. In addition to enhancing your credibility with clients and earning you recognition as an elite fitness professional, becoming an NASM Master Trainer opens the door to unique marketing and branding opportunities, including the chance to participate in pilot groups for upcoming NASM products and projects. To learn more, visit nasm.org/mastertrainer.

stresses the importance of focusing the challenge around the number of sessions or minutes of exercise completed, rather than on pounds lost, to build good habits.

Then, clients can choose to compete in the public version of the event, in which attendance and prizes are tracked on a leader board in the gym, or to participate more privately, tracking attendance on their own worksheet and not publicizing their results.

To keep the competition relatively fair for everyone during the busy season, Mahaffey advises allowing clients to book extra sessions for extra points on weeks when they are able, to help offset any travel that precludes their attendance at regular classes.

Mahaffey finds that the competition is most successful when it is short enough to stay interesting but long enough to be challenging. Coincidentally, the roughly 6-week period from Thanksgiving to New Year's Eve provides that perfect timeline.

After tallying the results and declaring first-, second- and third-place winners, Mahaffey offers these top three participants a "healthy" prize, such as a free training session or a gift card for a massage, fitness apparel or a healthy grocery store.

The intention of the contest is to keep clients accountable and motivated during the holidays, but the bonus is that it can start a conversation about prioritizing health

Sample Workout Program: Applying the Peripheral Heart Action System

A variation of circuit training called **the peripheral heart action system** focuses on alternating between upper-body and lower-body exercises throughout the circuit. This may improve circulation by distributing blood flow between the upper and lower extremities of the body. Here is an example that uses six exercises, but it can be increased to include 12 exercises for a "12 Days of Fitness" workout (see page 43).

1

reverse lunge (lower)

4

dumbbell shoulder press (upper)

5

Romanian deadlift (lower)

during any busy time in life. "[After the competition,] talk to them about what a great example this was of how they can make exercise happen when there's a lot going on," she recommends. "Funny how when there's a prize at stake, they're more likely to make the effort to reschedule rather than just cancel."

SPECIAL CLASSES WITH UNIQUE THEMES

It can be hard for clients to stay motivated when lots of exciting holiday activities are competing for their time and attention. Nino Magaddino, NASM Master Trainer with Max Flex Fitness in Naples, Florida, says his clients love it when he throws something different at them, such as a holiday workout with a "12 Days of Fitness" theme.

Most trainers have seen some version of this, but basically you count up from 1 to 12 or down from 12 to 1. He prefers to count "down," like this:

- 12 squats
- 12 squats, 11 jumping jacks
- 12 squats, 11 jumping jacks, 10 plank rows . . . (etc.)

See "Sample Workout Program: Applying the Peripheral Heart Action System" below for a helpful way to select and alternate among workout moves.

Another special workout format you could offer is a "sampler" class, in which clients participate in 20 minutes of indoor cycling, then 20 minutes of step, then 20 minutes

Assertiveness Training: Help Clients Avoid Giving In to Guilt

Learn how the NASM Behavior Change Specialization helps you help clients stay strong-willed.

Holiday temptations are as plentiful as unidentifiable chewy chunks in a fruitcake. So now is the perfect time of year for fitness professionals to dig deeper into the scientific research they can use to help clients avoid potential pitfalls such as, well, fruitcake.

The NASM Behavior Change Specialization (1.9 NASM CEUs) provides deeper insight into the field of psychology to help fitness professionals learn many interventional techniques, identify client triggers for demotivation, and connect each client with the strategies that can help him or her set and meet goals more successfully. One powerful example covered in the BCS course is assertiveness training.

WHAT IS ASSERTIVENESS TRAINING?

Even clients who don't *want* dessert may cave to an offer from a beloved friend or relative. Assertiveness training is a component of behavior therapy involving the modeling of positive behaviors—in this case by the fitness pro. Using this strategy, the fit pro will role-play with clients to give them a script to follow when faced with temptation. Below, we've adapted the "Just Say No!" worksheet from the BCS course to feature a possible holiday scenario.

SAMPLE SCRIPT: SAYING "NO" TO UNWANTED DESSERT

First, ask the client to name a person who will likely be offering tempting treats. The role of that person will be played by you, using the script below.

Person (played by you): So, _____ (client name), which desserts would you like a piece of tonight?

Client: Thanks. The desserts look fantastic, but I'm following a nutrition program, so I am not going to be able to have dessert tonight.

Person: Oh, come on! You can't diet during the holidays!

Client: Thanks, but no. This is important to me, and I want to remain committed to this goal.

Person: Well, how about just a small taste?

Client: No, that won't work for me. Compliments to the baker, but I'm going to have to remain firm on this. How about we play cards instead?

SOURCE: NASM Behavior Change Specialization Course.

of boot camp, for example. By filling the hour with a variety of activities, you keep the workout fresh and fun—and maybe even inspire die-hard indoor cyclists to add a boot camp class to their weekly workouts.

The point is to schedule something that will entice clients to make (and stick to) a commitment to come to class because it's a bit different from their regular routine.

ADDED ATTENTION FROM AN EXPERT NUTRITIONIST

Burning calories is important for clients, but so is stopping themselves from eating those calories in the first place, says Matt Boyer, NASM Master Trainer and a personal trainer at Anytime Fitness in Bedford, Indiana.

Boyer knows it's always valuable for clients to meet with a registered dietitian, but this is especially helpful during the holidays when clients are surrounded by tempting goodies just waiting to derail progress. Before the "eating season" begins, Boyer puts together a special package in which he partners with Wholehearted Nutrition (owned by his wife, Amanda, an RDN) to help clients get the input they need.

SUPPORT AND ACCOUNTABILITY FROM PEER GROUPS

Are people less likely to eat that extra cookie or skip their morning run if they have to tell someone about it? Maybe. That's why Boyer finds holiday accountability groups to be an effective strategy for helping clients stick with their routines even when life gets busy. An in-person group offers a camaraderie that some people enjoy, but a virtual group is also easy to set up, says Boyer. In the latter, members can correspond via text, email or their favorite social media platform.

By being a model of preparedness, you will show your clients—and yourself—that it really is possible to enjoy the holidays while maintaining a commitment to nutrition and fitness.

When creating groups, Boyer finds it useful to place clients with others who have similar interests or goals—say, one group may want to stick with marathon training, while another might be full of fitness newbies who are just starting their healthy journey. "When group members meet online or in person, it can be helpful for them to discuss the similar challenges they are facing and support one another during a tough time of year," Boyer notes.

REGULAR FACE-TO-FACE CHECK-INS

It's tempting to put check-ins on the back burner when your calendar is full, but they can be more important than ever at this time of year. These quick meetings can help keep clients on track and allow you to talk them through potential upcoming stumbling blocks.

If clients have just started working with Mills, he might consider the holidays as a time to collect data by having them keep a food diary, noting what they ate and what was going on before, during and afterward. "Sometimes,

new clients are not quite ready for an action-oriented goal," says Mills. They want to make changes, but they don't yet know what changes to make or why. "During the holidays, we can pinpoint what's important to them, and then we can implement those changes in the future, when it's appropriate."

For clients who have been with him for a while, Mills holds regular one-on-one mini-sessions in which he helps them set SMART goals (Specific, Measurable, Attainable, Realistic and Timely) and then assigns homework based on each client's particular needs. Often, the homework is related to setting boundaries and creating scripts like the one on page 44.

Maybe a client says he can't work out when he is visiting his mom because of the long list of projects she is sure to have waiting for him. "That's misleading," says Mills. "Instead, he can say, 'Hey, mom, I'm going for a walk because my health is important to me, but I can help you after.' When you phrase it like that, there's no way someone could object."

By helping clients have the words to protect time for exercise, Mills finds they are more likely to adhere to a workout schedule, even if it looks different from their normal one.

After an event (such as a holiday contest or 5K), Mills schedules a check-in session with clients to look at what worked and where they need to improve. He uses a numerical scale, asking clients to rate themselves from 0 (they didn't even try) to 10 (they performed exactly as they had planned). That offers a place from which to start moving the needle incrementally. "We'll hone in on what they did well and then find something they can do a little better, maybe to move from a 6 to a 7."

MOTIVATION FROM EMAILS AND SOCIAL MEDIA POSTS

Now is the time to fire up your client communication, Magaddino says. Yes, you may be inundated with other writing demands, from holiday cards to thank-you notes. But don't let that weaken your resolve to reach out using a variety of formats, from social media to email newsletters.

Magaddino's weekly email update includes motivation in the form of healthy holiday recipes and workouts that clients can tackle in a shortened time frame. He also keeps his social media primed with exercise demonstrations performed by different clients each time, including some husband-and-wife teams.

KEEP YOUR NAME ON YOUR CLIENTS' "NICE LIST"

When it comes to written communications, Magaddino says that the goal is to stay on your clients' radar throughout the busy holiday season so when your email or post shows up, it plants the seed to fit in a workout.

And that's the thread that binds these ideas together: Take the time now to plan far enough ahead to help your *clients* plan ahead, in turn. By being a model of preparedness, you will show them—and yourself—that it really is possible to enjoy the holidays while maintaining a commitment to nutrition and fitness.

CATHIE ERICSON *is a freelance writer who specializes in health/fitness and business topics. She loves group fitness classes, from boot camp to old-school step. Find her @cathieericson.*

Become a Certified Personal Trainer with NASM.

You already have what it takes; now is the time to become the go-to fitness expert.

NASM, the world leader in fitness certification, education and sports performance, empowers you to design effective, personalized training programs that will take your career and your clients to the next level.

NASM. Elevate your career.

SAVE $100* | **on the NASM Certified Personal Trainer Program (NASM-CPT)**

Call 800-460-6276 | **Promo Code AF100CPT.** Offer expires December 31, 2018.

*Terms and conditions apply. Excludes Life Time Academy and Exam Only programs.

Push, Pull and Shift: Learn the Power of Perturbations

DO YOUR CLIENTS NEED A LITTLE EXTRA NUDGE TO MAKE GAINS, MEET GOALS AND STAY MOTIVATED? HERE'S HOW PUSHING THEM OFF-KILTER—LITERALLY—CAN DO ALL THIS AND MORE.

BY KENNETH MILLER, MS

Many personal trainers and strength coaches have spent years—and hundreds, if not thousands, of hours—working with certain members of their clientele. For this fitness professional, the challenge in training these long-term clients over time becomes, "How do I help them continue to see results?" or, "How can I make their training sessions more interesting without turning them into a circus act with the latest gadgets and fads?"

The answer has been under our noses for a long time, and in some situations fitness professionals have already been using it. It's called perturbation.

Perturbation, as defined by *NASM Essentials of Sports Performance Training* (2019), is "a disturbance in motion that increases the chance of a breakdown in the [human movement system]." The application of perturbations—externally applied, unanticipated forces used to disturb physical movement patterns—has been clinically proven to improve balance, joint stability, postural control and longer-term success with return-to-activity programs (Fitzgerald, Axe & Snyder-Mackler 2000; Han, Ricard & Fellingham 2009; Rhon et al. 2013).

In my own practice as a personal trainer, I first implemented perturbation (without calling it that) 20 years ago, when I had my clients sit upright with arms extended while I pushed and pulled on their shoulders and arms, telling the clients to meet my resistance as best they could. Today, you can add a wide variety of perturbation tools and techniques to your fitness professional toolkit.

Perturbation Tools and Techniques

In the course of a training session, perturbation can be applied by using equipment that provides an unstable surface. For instance:

- **WHOLE-BODY VIBRATION PLATFORMS,** which produce vibrations (e.g., Power Plate® products); and
- **STABILITY-CHALLENGING TOOLS,** such as stability balls, foam pads, wobble boards, balance beams, discs and trainers (e.g.,

AIREX® Balance Pad, Core-Tex® Reactive Trainer and BOSU® PRO Balance Trainer).

It's also possible to add perturbation by performing exercises while

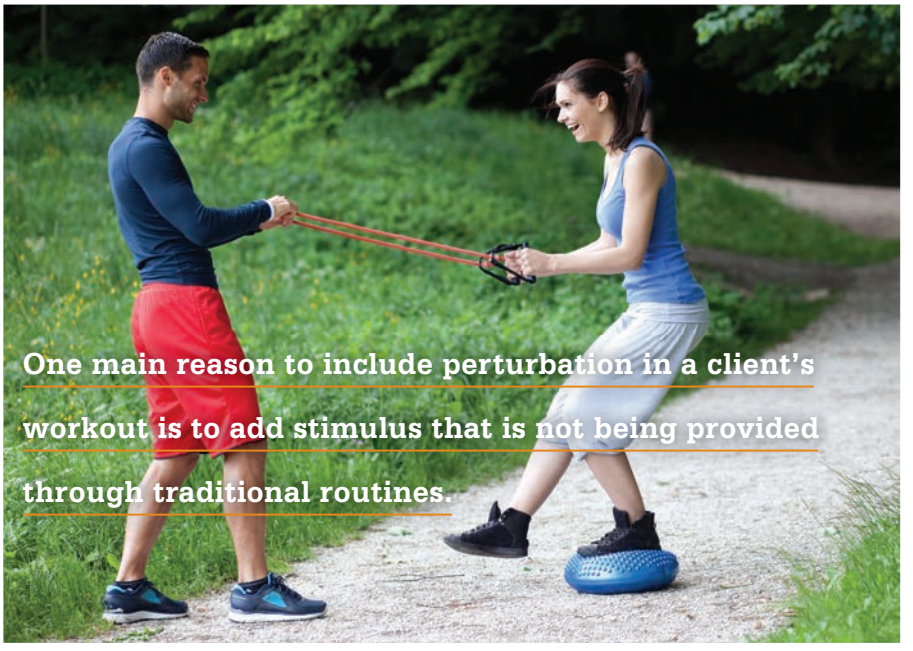
- **HOLDING A VIBRATION TOOL,** such as a Bodyblade® or the Hypersphere by Hyperice® (see below);
- **ADDING RESISTANCE WITH FITNESS TOOLS,** such as elastic tubing, a barbell, dumbbells, kettlebells, a ViPR™ or suspension equipment (e.g., TRX® Suspension Trainer™); or
- **ADDING RESISTANCE WITH WARDING (PUSHING) ACTIONS,** with *warding* being defined as "the physiological state of maintaining body-wide tension against an external force while producing gross movement patterns" (IOM 2012).

Here are a few specific examples of how a client's training program might include perturbation tools and techniques:

WITH RESISTANCE: performing alternating side lunges while holding a ViPR at shoulder height (to provide external force from above).

WITH WHOLE-BODY VIBRATION: doing squats or pushups on a vibrating platform.

WITH VIBRATION TOOLS: performing a quadruped scaption while holding a Hypersphere.



One main reason to include perturbation in a client's workout is to add stimulus that is not being provided through traditional routines.

WITH ELASTIC TUBING: executing a single-leg balance exercise with tubing on one ankle (Han, Ricard & Fellingham 2009).

WITH MANUAL/PARTNER RESISTANCE: doing pushups while being randomly pushed (warding) and pulled, such as laterally at the shoulder and hips. The goal is not to push or knock the person over, but to progressively apply enough force that he or she is challenged to overcome it.

On a Roll: Using High-Intensity Vibration for Recovery and ROM

In a small study—spearheaded by NASM's OPT creator Micheal Clark, MS, DPT, and Darin Padua, PhD, director of sports medicine at University of North Carolina, Chapel Hill—researchers studied 20 adults with compromised range of motion for ankle dorsiflexion (marketwired.com 2017). Specifically, all subjects had at least one myofascial trigger point in the gastrocnemius/soleus complex, and their ankle dorsiflexion measured less than 40 degrees. In the first testing session, participants were divided into two groups, with one doing self-myofascial release with vibration using the Vyper tool and the other doing SMR with a nonvibrating foam roller. In the second testing session, the groups switched SMR tools. Researchers found that subjects showed greater improvements in ankle dorsiflexion ROM when using the Vyper tool.

Hyperice followed the introduction of the Vyper high-intensity vibrating foam roller with the Hypersphere, a three-speed high-intensity vibrating massage ball. Its shape and size (5-inch diameter) make it even easier to localize treatment of trigger points and reach them more deeply.

Special offer: AFAA- and NASM-certified fitness professionals receive 20% off products such as these from Hyperice. Some restrictions apply. Learn more at Hyperice.com.

Perturbation for Physical Therapy and Sports Medicine

The settings that have traditionally used perturbation are physical therapy clinics and sports medicine facilities with return-to-play/activity programs.

PERTURBATION AS A REHABILITATIVE MODALITY

Manual therapy in the right clinical setting has been shown to improve joint function, proprioception, muscle control and reaction times (Rhon 2013). When manual techniques are used along with perturbation techniques, the added challenge to the rehabilitative process has yielded longer-term improvements in stability and proprioception (Han, Ricard & Fellingham 2009). In preparation for field-of-play contact, the therapist or athletic trainer may choose to incorporate perturbation beyond the rehabilitative process by stimulating on-field body contact during sport-specific drills.

PERTURBATION AS AN ASSESSMENT TOOL

Perturbation can also be used as an assessment tool to determine a client's readiness for full-contact play and reintegration into a sport or activity. Here are some examples of return-to-play perturbation-based assessments:

FOR A FOOTBALL RUNNING BACK. Player stands in staggered stance and attempts to maintain position as trainer applies lateral pushes. Observe postural stability and balance.

FOR A LACROSSE PLAYER. Player holds lacrosse stick steady as trainer applies perturbation to the stick from various angles. Observe anti-rotation motions and shoulder stability.

FOR A SOCCER PLAYER. Player performs pivot lunges forward and backward as trainer applies lateral pushes. Observe lateral and rotational trunk stability.

When Not to Be Perturbing

Whether perturbation is incorporated as a movement variation, an acute variable or a modality, there are contraindications for its use. Clients can be put at risk for injury if they have

- poor posture;
- poor postural control; and/or
- poor balance relative to the forces applied.

Using perturbations has been proven to improve balance, joint stability, postural control and return to activity.

A combination of **degree, direction and velocity of force** must be considered. Clients who are physically unprepared may use compensation patterns to meet the imposed resistance, thereby encouraging poor movement patterns and enhancing pre-existing muscle imbalances. Thus, an assessment is needed prior to adding perturbation to a client's program.

Pre-Perturbation Assessments

For any new client, the fitness professional needs to create an initial plan that takes into account the client's current fitness level and his or her health and performance goals. To apply the NASM Optimum Performance Training™ model, it is essential to begin with assessments in order to build a workout program that is both effective and safe.

The overhead squat assessment and single-leg squat assessment can both provide information on the client's muscular imbalances, postural control and balance. The results of these assessments, alone or combined, can guide initial use of perturbation techniques.

Sample Workout, Phase 1: Stabilization Endurance With Perturbation

The following program was created using the NASM OPT™ model. The warmup for either workout includes foam rolling, then static stretching of overactive muscles. These two versions of the workout might be done on weeks one (basic) and four (progressed) of a workout program.

	PHASE 1 WORKOUT	PROGRESSIONS WITH PERTURBATION
CORE/BALANCE/ REACTIVE CIRCUIT 	1–2 sets, 10 reps except where noted, slow tempo	1–2 sets, 10 reps except where noted, slow tempo
	Floor bridge (15 reps)	Floor bridge with feet flat on Power Plate (12 reps, lower setting)
	Single-leg balance with posterior reach	Add elastic tubing around ankles.
	Squat jump with stabilization	Trainer pushes client's shoulders from front during stabilization.
RESISTANCE CIRCUIT 	2–3 sets, 12–15 reps	2–3 sets, 12–15 reps
	Pushup	Trainer pushes client's torso.
	Standing cable row	Use uneven weight stacks.
	Forward step-up to balance	Lateral step-up to balance on Power Plate (lower settings)

Sample Workout, Phase 2: Strength Endurance With Perturbation

The warmup for either workout would be foam rolling, then active isolated stretching of overactive muscles.

	PHASE 2 WORKOUT	PROGRESSIONS WITH PERTURBATION
CORE/BALANCE/REACTIVE CIRCUIT	1–2 sets, 12–15 reps, moderate tempo	1–2 sets, 12–15 reps, moderate tempo
	Prone ball shoulder combo: Y-T-A	Client lifts arms in Y-T-A combo with straps secured to base of Power Plate (low to medium setting).
	Ball bridge with hands on hips	Trainer lightly taps ball.
	Single-leg squat	Client places elastic tubing around knee of planted foot; trainer pulls band posteriorly.
	Repeat squat jumps	Repeat squat jumps (no change)
RESISTANCE TRAINING SUPERSETS	2–4 sets, 8–12 reps	2–4 sets, 10 reps
	Superset 1: Push	
	Dumbbell chest press on flat bench	Dumbbell chest press on flat bench (no change)
	Single-leg, single-arm cable chest press	Trainer pulls on cable during motion to add light resistance.
	Superset 2: Pull	
	Band-assisted pullup	Band-assisted pullup (no change)
	Dumbbell bent-over cobra fly	Trainer taps client's shoulders.
	Superset 3: Squat/Lunge	
	Front sandbag squat	75% of sand is on one side of bag to create imbalance; alternate heavy side each set.
	Alternating side lunge	Client extends arms forward, palms up, and balances a 3-foot foam roller on open palms.

If assessment results indicate poor mobility, a lack of balance and/or poor postural endurance, the primary goal in most cases is to achieve better range of motion with body control and endurance. This can be done by incorporating an assessment-specific flexibility program addressing overactive muscles. Complementing the flexibility plan with a stability-based strengthening program should enhance muscular balance, proprioception and neuromuscular efficiency. Increased use of perturbation techniques can improve muscular coordination and, when implemented in later sessions, will further provide proprioceptive challenges.

Perturbation for Fitness

As mentioned earlier, perturbation techniques have a place in rehab as well as in fitness and performance. In the fitness realm, many instances merit the use of this modality in a training session. One main reason to include perturbation in a client's workout is to add stimulus that is not being provided through traditional routines. Adding perturbation will

- incorporate much-needed nervous-system and proprioceptive stimulus that is virtually nonexistent in today's chairbound society; and
- provide some fun and excitement beyond the usual routine.

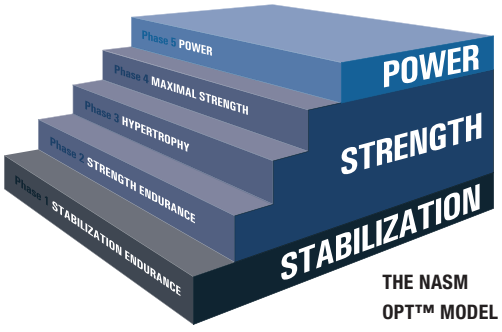
As clients progress in their conditioning and are better able to control or meet a certain level of perturbation, the variability and intensity can increase. Options include more forceful ball taps (mentioned in the sample program for Phase 2), longer holds, more varied directions and multiple-angle pushes during a single set.

Perturbation and High Intensity

Even when a client can be deemed physically ready for the added stimulus of perturbation, not all resistance training routines

will provide an ideal environment for it. In high-intensity programs designed for power and speed, perturbation may put the client at risk for injury. In Phases 4 and 5 of the NASM OPT™ model, where intensities can be 85%–100% of maximum effort, full attention needs to be focused on the movement pattern.

For example, if a client was performing 5 repetitions of a dumbbell chest press, injury risk would be high if the partner were to apply a lateral hand to the lifter's forearm or to add tension to an elastic band already looped around the upper arm. The same goes for a power-based movement, such as a ball slam; adding external resistance that could affect body position or posture during maximum speed production would be dangerous. Therefore, adding perturbation to resistance exercises in a high-intensity strength program may need to be relegated to whole-body vibration—for instance, by performing strength or power exercises while standing on a vibrating platform.



THE NASM OPT™ MODEL

In most high-intensity (power) scenarios, it is more appropriate to use perturbation techniques during the warmup, to increase nervous excitation and proprioception. During this part of the workout, as well as the flexibility, core, balance and plyometric (reactive) portions of a Phase 4 or Phase 5 workout, there are no heavy weights involved, so movements with perturbation added can be used with discretion.

As clients progress in their conditioning and are better able to control or meet a certain level of perturbation, the variability and intensity can increase.

No More Hesitation About Perturbation

There are multiple valuable applications for this training technique, whether it's for better balance (by restimulating the proprioceptors), postural control, or strength and power gains, or even to add some spice to the training session. Adding a lot more equipment or making exercises exponentially more challenging is not required to enhance or quicken results. A little unanticipated push here, a pull there, or the varied reactive offerings of a Core-Tex or AIREX pad will be enough to keep the training fun, interesting and, more importantly, purposeful. Perturbation—when used progressively and with the right intentions—can be the next acute variable modification to use with your clients.

KENNETH MILLER, MS, NASM-CES, PES, AND PAIN-FREE MOVEMENT SPECIALIST, *is a personal trainer and strength coach in the San Francisco Bay Area. He helps clients improve their capacity for movement.*

REFERENCES

Fitzgerald, G.K, Axe, M.J., & Snyder-Mackler, L. 2000. The efficacy of perturbation training in nonoperative anterior cruciate ligament rehabilitation programs for physically active individuals. *Physical Therapy, 80* (2), 128–40.

Han, K., Ricard, M.D., & Fellingham, G.W. 2009. Effects of a 4-week exercise program on balance using elastic tubing as a perturbation for individuals with a history of ankle sprains. *Journal of Orthopedic & Sports Physical Therapy, 39* (4), 246–55.

IOM (Institute of Motion). 2012. Introduction to warding patterns: Essential training for clients/athletes. Accessed July 18, 2018: instituteofmotion.com/store/webinars/introduction-to-warding-patterns-essential-training-for-clients-athletes/.

Marketwired.com. 2017. Hyperice announces study validating positive influence of local muscle vibration during foam rolling on range of motion and pain. Accessed July 26, 2018: marketwired.com/press-release/hyperice-announces-study-validating-positive-influence-local-muscle-vibration-during-2217325.htm.

NASM (National Academy of Sports Medicine). 2018. *NASM Essentials of Personal Fitness Training* (6th ed.). Burlington, MA: Jones & Bartlett Learning.

NASM. 2019. *NASM Essentials of Sports Performance Training.* (2nd ed.) Burlington, MA: Jones & Bartlett Learning.

Rhon, D., et al. 2013. Manual physical therapy and perturbation exercises in knee osteoarthritis. *Journal of Manipulative Therapy, 21* (4), 220–28.

Step: Still Alive When You Help It Thrive

STEP HAS PLENTY OF POTENTIAL WHEN INSTRUCTORS AND PROGRAMS CATER TO NEW RECRUITS AND EXPERIENCED VETERANS.

BY KYMBERLY WILLIAMS-EVANS, MA

"Step is alive and thriving." "Step took a dive and is not reviving." Odds are good you've heard one, if not both, of these conflicting statements. Many group fitness instructors, myself included, have been leading and loving this mode for years. Some program directors stay committed to step, knowing its benefits or wanting to keep longtime, loyal steppers happy. A few may wonder how to attract younger or newer exercisers. Others have given up, stacked risers into closets or back rooms, and taken step off the schedule.

Like the real estate market, the status of step's popularity seems to be local. Instructors in Central America anecdotally report strong participation, while attendance in the U.S. is uneven. Even within a given city, some facilities pack multiple step sessions like it's 1989, while nearby gyms schedule step just once a week for a handful of die-hards.

One vibrant program proves that step can be alive and well. "In my suburb, 20 miles east of Minneapolis, we have several super-popular BODYSTEP™ classes per week that are filled to capacity," relates Diane Hansen Olivieri, a longtime instructor and trainer in Hudson, Wisconsin. "The local YMCA stopped offering step, so those instructors and members approached the owners of our gym, who took on the program. Step has an almost cult following. In our gym, people are either all about BODYPUMP™ and step or wanting old-school step to come back, though perhaps with a twist."

What leads step to succeed in some places, while it shrivels in others? Perhaps the more important question is what can you, as a group fitness instructor or program director, do to generate strong numbers in step sessions?

Don't give in to the rumors that step is done and gone! Instead, try some of

the strategies from successful instructors and directors around the world. These step leaders all claim happy, energized, passionate step participants. Follow their leads to avoid the mistakes that longtime fitness pros warn will spell step doom.

Ditch the Dance: Mix and Match

Providing just enough variety may be why Tamara Grand, a group fitness instructor and online fitness coach based in Port Moody, British Columbia, is doing so well. "I've been teaching step for about 10 years now. Despite what I hear people at other facilities say about step being 'out of vogue,' my classes are always packed, and often we send people away because we're at capacity well before the class starts."

To keep step current and interesting, Grand uses techniques to appeal to step veterans while also making the program doable for self-declared nonsteppers.

1. COMBINE STEP PATTERNS WITH OTHER CARDIO AND STRENGTH ELEMENTS. Grand alternates step choreography, Tabata™ cardio intervals and multijoint strength exercises into an hourlong session that typically looks like this:

- 5–7 minutes: warmup moves on the floor and the step
- 7–10 minutes: basic step choreography
- 4–5 minutes: cardio intervals (typically on the floor to give people a break from the step: burpees, speed skaters, squat jumps, split lunge jumps, power-overs, etc.)
- 4–6 minutes: strength, two sets of 12–16 reps of two to three compound movements (squat-to-press, lunge and biceps curl, deadlift and row)
- Repeat from bullet #2, leaving 10 minutes for core and stretching.

2. CHOOSE ATHLETIC OVER DANCELIKE MOVEMENTS WHEN CREATING CHOREOGRAPHY. Grand sticks to movements on the step versus the floor to avoid complicating the patterns. She always teaches in 64-count patterns and rarely veers from 8-count movements.

3. ENSURE THAT EVERYBODY CAN DO THE WORKOUT. "Give beginners time to learn the patterns while layering more complex variations for more advanced steppers," Grand advises.

Top Step Mistakes Directors Make

1. offering only intermediate and advanced sessions, with no consistent, ongoing feeder slots to teach terminology and bring in new steppers
2. putting step sessions into a single time slot (Monday, Wednesday, Friday at 10 a.m.) with no other day or time options
3. having one instructor handle step programs across the same time slot (Tuesday and Thursday at 4 p.m. are always the same instructor)
4. programming step to compete with other group cardio options—for example, offering step, classic high/low and indoor cycling at 9 a.m. on Saturday in the same facility (Such scheduling splits the cadre of members who want music-driven group cardio workouts at that time.)
5. trying to address all skill and fitness levels in a single step session
6. dropping step programs based on low numbers and assuming the attendance is solely a reflection on the mode, instead of the instructor, the time slot, the session description or other factors listed above

Do the Dance: Follow Three P's

In contrast, Alexius Coronado is famous in South and Central America for his popular and dynamic dance-based step programs. Creator of "Step Plus" and former National Sportaerobics Champion with 11 gold medals, Coronado has presented and offered multiple step certifications in his 28 years as a fitness instructor, first in Venezuela and now in Panama.

What are his secrets to sustaining devoted and large followings year after year in his classic, "pure" cardio step sessions? They boil down to three "P's": planning, personality and progression.

Begin with **planning,** Coronado advises. He recommends preplanning the majority of the choreography, with a backup pattern or combo block ready in case you need to adapt on the fly.

"I always introduce at least one new pattern in each session, whether it's a level one, two or three class," Coronado says. "When I teach level three, I use one

block and two sequences, or two blocks, with a block consisting of 32 counts per lead-leg side and a sequence having 16 counts per side."

Coronado notes that when his content is well-planned, he can focus more on the second "P": **personality**.

However, **progression** is what Coronado promotes as the true key to filling step sessions. "Go one change at a time until all your students are able to perform the move," he says. "Even with my level-three classes, I start with a simple or basic step, then I introduce my change—plane, direction—in order to give everyone a sense of achievement." His progressions rely heavily on layering, substituting and cross-phrasing (a method adapted from Brazil), not just simply adding on.

Step Around Generational Challenges

Jennifer DeMarco, MS, brings young steppers into the fold as an adjunct professor in the exercise science and wellness department at both Grossmont-Cuyamaca Community College and Southwestern College in San Diego. According to DeMarco, who has been teaching step for decades, exercisers in their early 20s face challenges learning step that baby boomers did not.

"Students who currently attend my college classes have not grown up doing rhythmic exercise," DeMarco explains. "It is a real challenge for them to assimilate rhythms, match movement and music patterns, alternate lead leg, and be comfortable with options. They need the *exact* visual demonstration."

DeMarco's experience leads her to conclude that "with the 20-somethings, I have the most success with beats per minute around 120. I also recommend simple, strong choreography with minimum arm movements. Each class includes a walk-through of new steps with no music" so participants can practice.

DeMarco believes several factors led to step's decline in popularity: music that got faster and faster, excluding and intimidating new participants; sessions characterized by complex, sometimes unsafe choreography; and programs that did not offer basic or introductory sessions during desirable time slots.

STEP MINI-HISTORY: Longtime steppers often heard how the activity originated from Gin Miller's rehab for a knee injury. Step was a cure for—not the cause of—joint problems. Younger exercisers don't know that story; they only see the result of years of classes that became too fast, with too many turns, on too many risers. Their conclusion? Step is dangerous.

This perception makes it harder to attract younger exercisers, says Yoreme Flores, ranch circle coordinator and concierge for Rancho la Puerta Fitness Spa in Tecate, Mexico. "More than half of my friends—mostly 30-year-olds—have the wrong idea about step classes. [They] think step is bad for their joints. When I ask if they have ever read about the benefits, they say most of the articles they've read focus on joint damage.

"My suggestion would be for the industry to make a point of informing younger folks on the history, benefits and safety of step. Oh, and the importance of . . . not doing a crazy 100-miles-per-hour step class."

Top Tips That Lead to Step Success

- Commit to a multilevel, complete program that offers introductory and beginning sessions that teach fundamental step moves. Put these feeder sessions at attractive—not throwaway—times.
- Intersperse cardio step with athletic and/or strength moves.
- Preview new moves with the music off, especially for novice steppers in their 20s or 30s who may have limited experience with rhythmic cardio programs.
- Keep to 120–124 beats per minute for novice and beginning steppers.
- Offer intensity options, not just complexity ones.
- Face the group as much as possible. Mirror participants except when moving from front to back of the riser, then "right-footing."
- Set up an instructor's step at the back and front of the room. Switch to the step that participants are facing to provide a visual model throughout.
- Use a variety of music styles and genres.
- Introduce at least one new pattern or block each session.
- Use "descriptive" cues that build on fundamental step moves—for example, L-step to a grapevine, return the grapevine and finish the L-step—instead of assuming everyone knows what "walk off L-step" means.
- Balance right and left lead legs, and have balanced, symmetrical combinations.
- Model all moves with excellent technique, whether it's a simple knee lift or a creative modification. If you cannot execute your own combos with quality technique, then you may be progressing too rapidly, using beats per minute that are too fast or focusing too much on "what" instead of "how."
- Progress from easy to complicated, but not from complicated to impossible.

Top Step Mistakes Instructors Make

- presenting too much complexity
- moving to a beat higher than 134 beats per minute for classic step choreography (i.e., stepping too fast)
- not addressing concerns and myths about step injuries; failing to educate potential steppers about its safety
- using "naming" cues such as "volcano" or "double dip" that exclude nonregulars and may mean nothing to people new to the session, even if they are experienced steppers
- allowing an experienced stepper to do his or her own thing, thereby distracting, confusing and intimidating others in the session
- thinking that "beginning" means teaching with low energy, highly repetitive content or a monotone voice throughout the program
- falling into the trap of "if some is good, more must be better" in terms of speed, complexity, intensity and vocal energy (constant yelling, for instance)
- showing off how clever and creative they can be on the step, rather than making sure they bring along all participants (If experienced steppers are struggling to follow, it's you, not them.)

"More than half of my friends—mostly 30-year-olds—have the wrong idea about step classes. [They] think step is bad for their joints."
—Yoreme Flores

Step Can Attract Newcomers and Veterans

Unless we can attract new and young steppers, this exercise mode faces a future of generational attrition. Many classic cardio step programs are composed of die-hard enthusiasts who have remained dedicated since the beginning. In other words, experienced steppers are mostly boomers and older adults. They have been attending step programs for almost 30 years, dropping out over time as a result of aging bodies, changing needs and competing interests. Step instructors and programmers need to find ways to entice the younger generations.

Perhaps they already have, as evidenced by Grand's course and many other hybrid adaptations like it around the world. For example, Emily Bosworth Harmer has been teaching Group Blast for 5 years with strong demand at Miss FIT in Ellicott City, Maryland. Group Blast, developed by MOSSA™, uses the step platform to train fitness, agility, coordination and strength for a high-energy, prechoreographed workout program.

Bosworth Harmer believes the step-based program is successful because "participants can anticipate what is coming, given its preset modules; the 4-week shelf life prevents boredom; and the athletic yet attainable movements do not look or feel like an 'aerobics' class, though [they] definitely demand cardiac output. The wide variety of movements and challenge draws all ages in and keeps people coming back," she asserts.

Whether you are keen to bring in younger people, boomers, newbies, returnees or anyone who wants to go up and down on a step platform, be like Coronado, who brings a fourth "P" to all his step programs: **passion.** As he notes, "Once newcomers achieve the final product, they feel such a sense of accomplishment that they start believing in the magic that is step class."

KYMBERLY WILLIAMS-EVANS, MA, *has taught step over three decades on four continents and in four languages. She specializes in group exercise for boomers, with a side passion for "fancy dancey" cardio step programs.*

Real music.
By real pros.

Made by world class recording and audio engineers, Yes! Fitness Music brings the highest quality, legally protected music to the group fitness industry. Each week, we pump out hot new remixes that make your classes crazy fun.

GET YOUR

FREE MIX!

CALL
1-800-321-9379
or
VISIT
www.yesfitnessmusic.com/afaamix

AFAA Official music partner

yes! fitness music

BY ALEXANDRA WILLIAMS, MA

Prefer Plants, Not Pills:

Takeaways from the new research on supplements.

You have likely heard the buzz about vitamin and mineral supplements being ineffective. However, here's a detail that was less-often repeated in the headlines: The research being reported focused specifically on how supplements affected *cardiovascular disease*—not on their use to correct deficiencies.

David Jenkins, PhD, led the study, which was published in the *Journal of the American College of Cardiology* (2018; 71 [22], 2570–84). According to his interview with ScienceDaily.com, Jenkins was "surprised to find so few positive effects of the most common supplements that people consume" (May 28, 2018). After performing systematic reviews and extensive meta-analyses on 179 studies that spanned 4 years, he and his colleagues found that research on the four most popular supplements—multivitamins, vitamin D, calcium and vitamin C—showed no consistent benefit for preventing CVD or all-cause mortality. And, while folic acid and B-complex vitamins with folic acid were shown to reduce the risk of stroke, people who took niacin and antioxidant mixtures with a statin appeared to have an *increased* risk of all-cause mortality during the study.

According to Kat Barefield, MS, RDN, NASM-CPT, CES, PES, and owner of Inspired Solutions, a San Diego–based consulting company for teams, athletes and celebrities, "This paper shows how challenging it is to study supplements and how they impact the risk of CVD." For fit pros and clients seeking to prevent or minimize the effects of CVD, the data is not definitive, Barefield says. She adds: "Using supplements to correct nutritional inadequacies would be the reason to use vitamin and mineral supplements, though caution should be taken, since the FDA does not require they be tested for safety or efficacy."

Ultimately, Jenkins et al. conclude what many of us already live by: You and your clients would do well to focus on ramping up vitamin intake by consuming more plant foods, in which many required vitamins and minerals naturally occur. But follow the advice of your doctor and/or nutritionist regarding individual supplementation needed to maintain good health.

Encourage Clients to "Invest" in Their Health

At the Nutrition 2018 conference hosted by the American Society for Nutrition, Carolyn Scrafford, PhD, MPH, presented an analysis showing that the U.S. could save billions in health-related costs through better adherence to healthy dietary patterns.

The meta-analysis, funded by the National Dairy Council, comprehensively examined potential cost savings from improved adherence to the 2015 Healthy Eating Index (HEI) and a Mediterranean-style diet (MED). Today, the average U.S. adult adheres to just 60% of criteria for the HEI and earns only 3.5 out of 9 possible points on a scoring system for the MED.

By examining the link between dietary patterns and health outcomes, Scrafford and colleagues calculated that 20% greater adherence to the MED could equal nationwide cost savings of about $12–$38 billion, and a similar uptick in Americans' adherence to the HEI could equal a U.S. savings of $30-$47 billion. If people met 80% of the criteria for either eating plan, the annual cost savings could be $52–$200 billion! In these estimates, the lower figure includes costs related to breast, colorectal and prostate cancer, coronary heart disease, stroke, type 2 diabetes, hip fractures, and Alzheimer's disease. The higher number includes these conditions and all types of cancer.

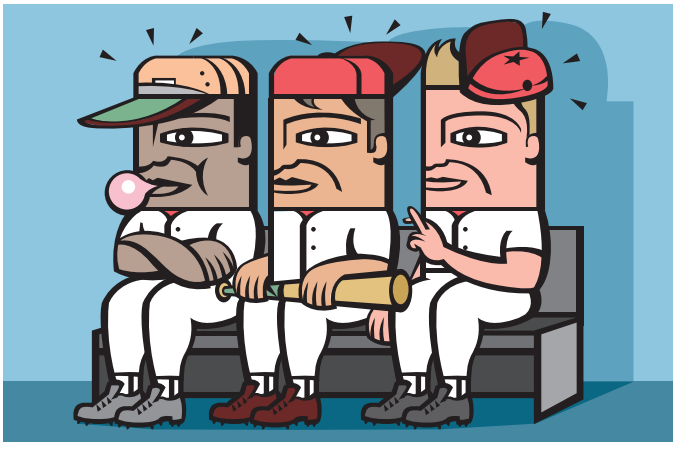
"It's worthwhile to educate Americans on these dietary patterns and their components, to encourage them to make little changes to improve their diet quality," says Scrafford. Considering the individual costs of treating disease, dietary changes might improve a client's bottom line, too.

CAN CAFFEINATED GUM BOOST PERFORMANCE?

Looking for an easy boost during an important performance workout? Here's something you may want to chew on: caffeinated gum. So says a study of 18 male team-sport athletes, published in *International Journal of Sport Nutrition and Exercise Metabolism* (2018; 28 [3], 221–27). Interestingly, though, the gum helped only those who typically consumed less than 40 milligrams of caffeine per day.

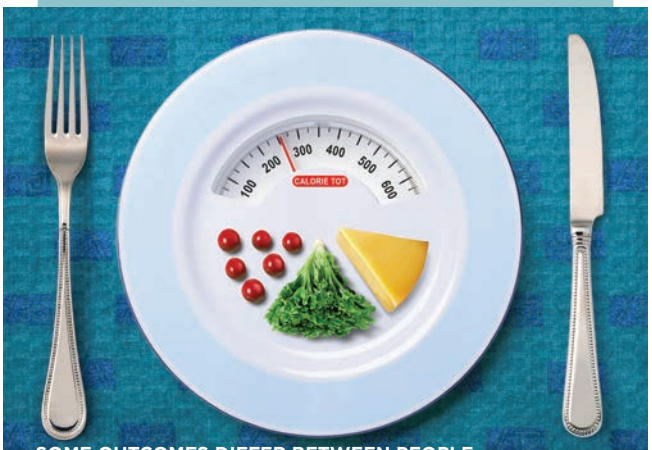
In this small but randomized, double-blind study, all of the men performed 10 sprints (40-meter shuttle runs with 30 seconds of rest between them), and the research team assessed their repeated-sprint performance (RSP). After two "familiarization sessions," the men chewed either gum containing 200 milligrams of caffeine (equal to about 2 cups of caffeinated coffee) or uncaffeinated gum (a placebo).

Participants who habitually consumed low amounts of caffeine enjoyed some "perks," experiencing less of a decline in



RSP throughout the drill when chewing the caffeinated gum. Sadly, for those who habitually drank 3 or more cups of coffee per day, neither type of gum did more than freshen their breath.

Intermittent Fasting VS Continuous Calorie Cuts



SOME OUTCOMES DIFFER BETWEEN PEOPLE WITH HIGH BLOOD SUGAR AND THOSE WITHOUT.

With new trends emerging each year, staying on top of the latest research will help you answer clients' questions appropriately. Case in point: intermittent fasting. A study published recently in *Obesity* found that people who fasted on alternating days experienced significant fat loss—likely because the body relies on ketones as fuel when glucose (sugar) is not available (2017; 26 [2], 254–68). The study further concluded that the practice may also slow processes related to aging and disease.

However, intermittent fasting may prove tough for some, based on their response to hunger. In the July 2018 issue of *Nutrition, Metabolism & Cardiovascular Diseases*, researchers reported on a study of conventional calorie-restriction diets versus intermittent fasting performed continuously for 1 year (28 [7], 698–706). The IF group took in <600 calories on 2 nonconsecutive "fast" days per week, while the other group received meal plans in which calorie constriction was relatively consistent from day to day. Both groups followed a Mediterranean-style diet.

At the end of the year, both groups showed improvements in weight loss, waist circumference, blood pressure, triglycerides and HDL (good) cholesterol. However, the IF group participants reported higher hunger scores and lower feelings of well-being than the other group.

So, while IF can be effective, it may be a tough road for people who lose resolve when hunger hits. Bottom line: Encourage clients to work with a registered dietitian or other allied health professional to ensure their eating plan is best suited to their body's response.

Go Ahead: *Mangia* Some Pasta!

Quick quiz: Is pasta high or low on the glycemic index?
You may be somewhat astonished to learn that the correct answer is "low"! (Which, of course, means that it has less of an effect on blood sugar levels than high-GI foods like white bread.) Even more of a surprise: Pasta may not be the culprit in weight gain that so many believe it to be.

A systematic review and meta-analysis of 32 randomized controlled trials involving nearly 2,500 adults was recently conducted on people who ate pasta (about 3.3 half-cup servings per week) instead of other carbs as part of a healthy, low-GI diet (*BMJ Open,* 2018; 8:e019438).

"The study found that pasta didn't contribute to weight gain or [an] increase in body fat," said study author John Sievenpiper, MD, PhD, FRCPC, in a press release from St. Michael's Hospital in Toronto (April 3, 2018). "In fact, analysis actually showed a small weight loss [of about 1.4 pounds]. So contrary to concerns, perhaps pasta can be part of a healthy diet such as a low GI diet."

When reporting their results, the researchers expressed caution about generalizing their findings to all body weight and adiposity outcomes, given that the trials assessed pasta in the context of low-GI dietary patterns only. Also, in the interest of transparency, it should be noted that pasta maker Barilla provided some support for the study, though its experts hailed from the University of Toronto and St. Michael's.

We asked Kat Barefield, MS, RDN, NASM-CPT, CES, PES, what the findings can reveal for fit pros. "It's important to not vilify single foods or food groups," she asserts. "This study shows that pasta in and of itself does not lead to weight gain and can be part of a healthy diet, though it's important to keep portions and total calorie intake in check."

GET A JUMP ON EXERCISE RECOVERY

USING A JUMP PROTOCOL, RESEARCHERS STUDIED THE RECOVERY EFFECTS OF LEMON VERBENA EXTRACT.

In some energizing news for endurance exercisers, results from a small randomized, double-blind, placebo-controlled study showed "less muscle damage as well as faster and full recovery" after exhaustive exercise among participants receiving a daily 400-milligram dose of lemon verbena extract (brand name: Recoverben®) rather than a placebo.

Participants took the supplements for 15 days. On day 11, all subjects (active men and women aged 22–50) were put through an "intensive jump protocol": While carrying a load equal to 10% of their body weight, they performed 10 sets of 20 standing vertical (aka countermovement) jumps with 4 seconds between jumps and 90 seconds of rest between sets.

Researchers assessed muscle strength, pain and other factors immediately before the jumps, as well as 3, 24, 48, and, for some measures, 72 and 96 hours afterward. **The lemon verbena group reported less movement-induced pain following exercise, and their muscle strength was completely back to baseline after 48 hours (it took longer for the placebo group).**

Full details of the study, which was funded by Vital Solutions GmbH (maker of a key ingredient in Recoverben®), are available in the *Journal of the International Society of Sports Nutrition* (2018; 15 [5], 1–10).

Diet Drinks Can Sink Weight Loss Efforts

For many people trying to slim down, using low-calorie sweeteners seems like a no-brainer, but recent research shows it may not be such a good idea. People who have obesity as well as prediabetes or diabetes are at an even more heightened risk of metabolic syndrome (a collection of risk factors for cardiovascular disease) if they consume low-calorie sweeteners, say researchers at George Washington University, in Washington, D.C. They presented their findings at ENDO 2018, the 100th annual meeting of the Endocrine Society, in Chicago.

By analyzing fat samples from people of different weights, lead researcher Sabyasachi Sen, MD, and his team found "significant evidence of increased glucose [sugar] transport into cells and overexpression of known fat-producing genes" in participants classified as overweight or obese.

Sen and his team also tested 0.2-millimolar doses of sucralose (equal to four cans of diet soda per day) on stem cells taken from human fat tissue. After 12 days, the cells showed increased expression of genes that are markers of fat production and inflammation.

"Low-calorie sweeteners promote additional fat accumulation within cells, compared with cells not exposed to these substances," Sen reported in a March 2018 press release from the Endocrine Society. Further, as the dose of sucralose increased, so did its negative effects. The sweetener appears to "unlock" cells, allowing more glucose to enter, and sucralose may also contribute to a slowdown in metabolism, both of which may explain the fat buildup.

Because people who have obesity and diabetes are already at risk for heart attacks and strokes, it may be helpful for fitness professionals who work with this population to assess for consumption of low-calorie sweeteners, especially sucralose.

RESEARCH HAS SHOWN THAT LOW-CALORIE SWEETENERS, LIKE THOSE IN DIET SODA, PROMOTE FAT BUILDUP IN CELLS.

A New Breed of Beefless Burger

For non-meat-eaters who miss the taste of a hamburger, here's some yummy news: It's now possible to enjoy a "veggie burger" that tastes like meat. The meaty flavor of this product—made by Impossible Foods, a Silicon Valley startup backed by Bill Gates—comes from *heme.*

Heme is an essential nutrient normally found in animal proteins, but it also occurs in soy roots, which provide the heme for these burgers. Food lovers wanting to sink their teeth into an Impossible Burger can visit impossiblefoods.com/locations to find a list of restaurants that serve it. Though the company is now focusing on growing its restaurant-supply biz, it hopes to expand into retail at some point in the future.

MMM . . . AND IT'S JUICY, TOO, THANKS TO AN INFUSION OF BEET JUICE.

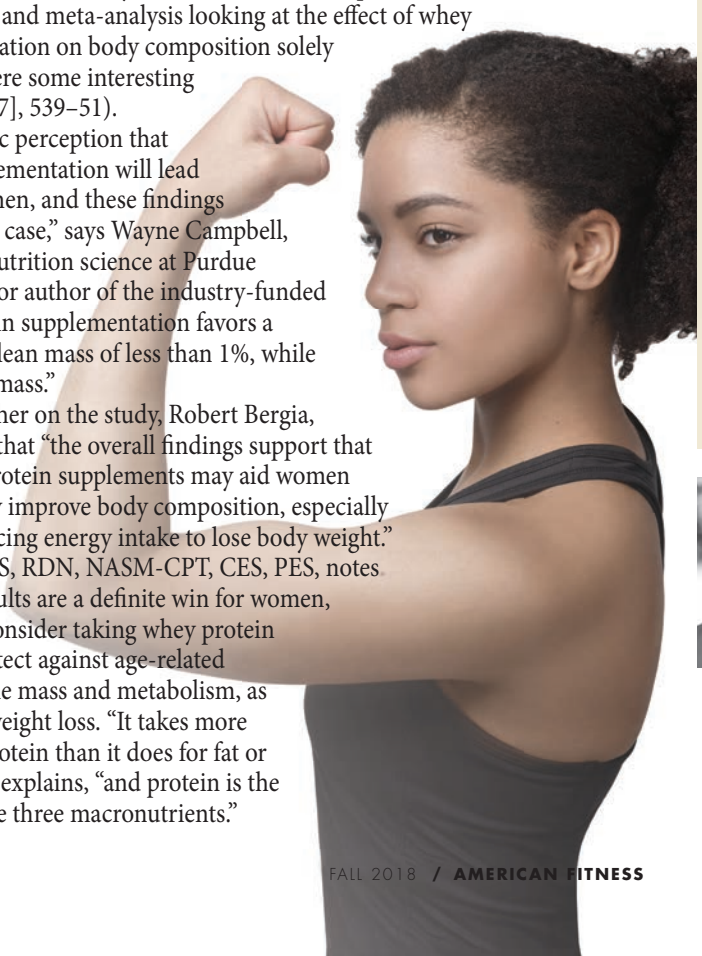
WHEY PROTEIN: A WOMEN'S STUDY AT LAST

Since the beginning of time, or at least since the beginning of research on whey protein, the focus has been on men. Until now! Earlier this year, *Nutrition Reviews* published a systematic review and meta-analysis looking at the effect of whey protein supplementation on body composition solely in *women.* There were some interesting findings (2018; 76 [7], 539–51).

"There is a public perception that whey protein supplementation will lead to bulkiness in women, and these findings show that is not the case," says Wayne Campbell, PhD, professor of nutrition science at Purdue University and senior author of the industry-funded study. "Whey protein supplementation favors a modest increase in lean mass of less than 1%, while not influencing fat mass."

The lead researcher on the study, Robert Bergia, from Purdue, adds that "the overall findings support that consuming whey protein supplements may aid women seeking to modestly improve body composition, especially when they are reducing energy intake to lose body weight."

Kat Barefield, MS, RDN, NASM-CPT, CES, PES, notes that these study results are a definite win for women, who may want to consider taking whey protein supplements to protect against age-related reductions in muscle mass and metabolism, as well as to support weight loss. "It takes more calories to digest protein than it does for fat or carbohydrates," she explains, "and protein is the most satiating of the three macronutrients."



Super-Simple Pumpkin Protein Smoothies

If you're in the mood to add some nutty flavor to your pumpkin smoothie, try adding hemp powder. Recipe courtesy of NASM-CPT Nicole Drinkwater (fitfulfocus.com) of Austin, Texas:

BLEND:

- 1½ cups milk of your choice
- 1 scoop vanilla hemp protein powder
- ½ frozen banana
- dash of pumpkin spice
- ½ cup frozen pumpkin purée*

**Nicole's tip:* To make frozen pumpkin purée, transfer canned pumpkin into an ice cube tray or spoon the pumpkin onto a cookie sheet in tablespoon-size dollops, then freeze.

ALEXANDRA WILLIAMS, MA, *works in the exercise science and sport studies department at UC Santa Barbara with a lot of students who need to improve their nutritional intake.*

When (and Whether) to Toast: Alcohol Research Review

YOU'RE LIKELY TO FIELD QUESTIONS ABOUT ALCOHOL AND ATHLETICS. THE BEST ANSWERS, AS ALWAYS, ARE THOSE GROUNDED IN SCIENTIFIC RESEARCH.

BY GEOFF LECOVIN, MS, DC

As the weather chills and clients start unpacking their Halloween ghost-and-goblin decorations, they may also start uncorking some spirits . . . of the liquid variety. Made through fermentation of grains, fruits, honey or plants, alcohol has been used medicinally, socially and in religious ceremonies throughout history. It's a cultural mainstay.

It isn't without its problems, of course. According to the most recent statistics available from the National Council on Alcoholism and Drug Dependence, "Alcohol is the most commonly used addictive substance in the United States: 17.6 million people, or one in every 12 adults, suffer from alcohol abuse or dependence along with several million more who engage in risky, binge drinking patterns that could lead to alcohol problems" (NCADD 2015).

Interestingly, *moderate* alcohol consumption has been associated with some positive health outcomes in a wide range of studies conducted over the past several decades (see "Key Terms" on page 65 for more detailed definitions pertaining to alcohol use). Every so often, new research emerges that piques the curiosity of clients from all walks of life. One study may cause people to wonder if it would be wise to *begin* adding a daily dose of spirits for health purposes, while another study might prompt those who do imbibe to rethink their choice. And then there are "athletic" events like 5K pub crawls that raise a whole new set of questions.

Without promoting drinking, how do you answer clients' questions regarding use, nonuse, misuse or overuse of alcohol? What do you say to those who don't yet drink but wonder if they should? Here's a brief overview of the research.

Potential Benefits of Light-to-Moderate Alcohol Use

Studies have revealed some positives regarding **moderate drinking** and various aspects of health.

CARDIOVASCULAR HEALTH

Moderate consumption of alcohol has been linked with a reduced risk of development of and death from heart disease (NIAAA 2017), sometimes known as a **cardioprotective effect.** This is not *new* news: More than 15 years ago, a study associated moderate alcohol consumption with a reduced risk of coronary

heart disease, total and ischemic stroke, and total mortality in middle-aged and elderly men and women (Agarwal 2002). The mechanisms by which this occurs include increased levels of high-density lipoprotein cholesterol (HDL), decreased levels of low-density lipoprotein cholesterol (LDL), clot formation prevention, reduction in platelet aggregation, and lowering of plasma apolipoprotein A concentration. Thus, alcohol was found to reduce the risk of coronary heart disease both by inhibiting the formation of plaque buildup in arteries and decreasing the rate of blood clotting (Agarwal 2002).

STROKE RISK

A meta-analysis published in *BMC Medicine* revealed that light and moderate alcohol consumption were associated with a lower risk of ischemic stroke (a stroke caused by a blockage) and were not linked to any type of hemorrhagic stroke (a stroke caused by a burst blood vessel). Experts theorized that changes in cholesterol profile (see Cardiovascular Health) may, in part, explain alcohol's link to reduced risk of ischemic stroke (Larsson et al. 2016).

However, again, moderation is key: This same study found that drinking about three or four drinks (or more) per day was associated with increased risk of *all* types of stroke, especially hemorrhagic. This may be because as alcohol consumption increases, so does the risk of hypertension (high blood pressure), which in turn increases the likelihood of a burst blood vessel (Larsson et al. 2016).

Editor's note: In late August, *The Lancet* published a sweeping global study that rejects the idea that moderate drinking may have some benefits. No amount of alcohol is safe, according to this new research. We will report on the study in the next issue, in the meantime, you can read it at doi.org/10.1016/S0140-6736(18)31571-X.

OVERALL WELL-BEING

Alcohol consumption triggers the release of endogenous opioids, such as endorphins, which can temporarily enhance one's sense of well-being. Therefore, social consumption of alcohol may have effects similar to other endorphin-releasing social activities—including laughter, singing and dancing—that we use to reinforce social bonds (Dunbar et al. 2017). Interestingly, a recent study of more than 9,000 British adults revealed that people between the ages of 23 and 55 who drank no more than 14 units (about 6 pints of low-alcohol beer or 6 medium-sized glasses of wine per week) *and did not smoke* reported the "best overall health and well-being across numerous indicators," compared with other groups at various levels of alcohol and tobacco use, including "infrequent drinking/abstention." However, light-to-moderate drinkers did not reap the same benefits if they had other risks, such as

Beer and Wine: What About the Antioxidants?

Maybe you've heard your clients or participants talk about a recent study of the health benefits of red wine and beer "thanks to the antioxidants." But what does the research say?

It's true that these beverages contain some healthy compounds: Arranz et al. (2012) discovered evidence that certain polyphenols in wine—such as resveratrol, anthocyanins and flavonols—provide an abundance of health benefits, including protection against cardiovascular dysfunction and cancer. In beer, xanthohumol and its metabolites isoxanthohumol and phytoestrogen 8-prenylnaringenin also provide properties that offer anticarcinogenic, anti-invasive, antiangiogenic, anti-inflammatory and antioxidant effects.

However, the benefits associated with red wine and beer are dependent on how much is consumed and, possibly, the other elements in the imbiber's diet. For example, the health benefits associated with the Mediterranean diet—which combines moderate wine and beer consumption with a diet rich in fruits, vegetables and whole grains—suggests that polyphenols have synergistic effects with compounds found in other groups of good-for-you foods.

Bottom line: More randomized clinical trials that focus on the actions of alcohol and polyphenols and their mechanisms are needed (Arranz et al. 2012). However, the recommendations in the accompanying article still stand: There's no need to start drinking these beverages for their health benefits, but if your clients already consume them, they would be wise to keep their intake to moderate amounts or less.

being a former smoker, having obesity or not exercising regularly (Staff & Maggs 2017; Miller 2017).

Potential Problems With Heavy Alcohol Use

It's well known that there are many negative health consequences associated with habitual heavy alcohol consumption, or alcohol abuse. Chronic alcohol abuse is associated with pathophysiological changes in multiple organs, often resulting in life-threatening clinical outcomes—including breast and colon cancer, pancreatic disease, cirrhosis of the liver, diabetes, osteoporosis, arthritis, kidney disease, immune system dysfunction, hypertension, coronary artery disease, alcohol-induced cardiomyopathy, and heart failure, as well as central nervous system disorders (Dguzeh et al. 2018). Here are some additional study results.

Heavy alcohol use has been identified as a risk factor for many types of cancer, including breast, colorectal, liver andesophageal, in addition to cancers of the oral cavity, pharynx and larynx.

BRAIN HEALTH AND FUNCTION

People with alcohol use disorder have a global loss of brain volume that is most severe in the frontal cortex. This likely contributes to the dysfunctional poor decisions associated with alcohol dependence (Crews & Vetreno 2014). Interestingly, in a study published in *BMJ*, even moderate drinkers (14–21 units weekly, where one unit is 10 milliliters) were more likely to show atrophy in gray matter and the right side of the hippocampus, as well as a faster decline in verbal fluency, compared with those who drank little to nothing (Topiwala et al. 2017).

CANCER RISK

Heavy alcohol use has been identified as a risk factor for many types of cancer, including breast, colorectal, liver and esophageal, in addition to cancers of the oral cavity, pharynx and larynx (Bagnardi et al. 2015).

Alcohol and Exercise Considerations

How does alcohol use relate to a healthy, active lifestyle? Will drinking impair performance and hamper goals? Here's what some of the research says.

Muscle adaptations. Is it okay for clients to drink alcohol after a strength training session? Not if they want to see results! Research shows that drinking after resistance exercise may hamper desired muscular adaptations by reducing anabolic signaling, particularly in men (Duplanty et al. 2017).

Hydration. Alcohol has a negligible diuretic effect when consumed in a dilute solution after a moderate level of hypohydration induced by exercising in the heat. In a very small study, men who consumed a moderate amount of beer after exercise experienced no negative effects on hydration markers (Jiménez-Pavón et al. 2015).

Sports performance and recovery. A 2014 report in *Sports Medicine* asserted that athletes are often coached to abstain from alcohol consumption, yet they often consume more alcohol (in volume) than the general population. Interestingly, it was noted that the impact of alcohol on sports performance and recovery depends on many factors, including when and how much is consumed, injury status, and necessary recovery time for that particular session. Still, the high amounts consumed by some athletes "may negatively alter normal immunoendocrine function, blood flow and protein synthesis" (Barnes 2014).

The data regarding the possible detrimental action of alcohol in the recovering athlete is equivocal. Based on available experimental evidence in cellular and rodent models, however, athletes should be cautious about ingesting alcohol following intense exercise (Vella & Cameron-Smith 2010) and should instead focus on the four R's of recovery: Refuel, repair, rehydrate and revitalize.

Weight gain. If a client is working hard and not seeing results, that habitual nightcap could be a factor. Nutritionally, alcohol supplies 7 empty calories per gram. Heavy alcohol intake (more than 30 g per day) contributes directly to weight gain and obesity, regardless of the type of alcohol consumed (Traversy & Chaput 2015).

If a client is working hard and not seeing results, that habitual nightcap could be a factor.

CARDIOVASCULAR HEALTH

Habitual high levels of alcohol consumption (more than two drinks per day for women and more than three drinks per day for men) are associated with an increased cardiovascular risk (including hypertension, cardiomyopathy and atrial fibrillation) and a higher risk of stroke (O'Keefe et al. 2014).

DIGESTIVE HEALTH AND IMMUNITY

Heavy alcohol use harms the gastrointestinal tract by damaging the mucosa of the esophagus and stomach, modifying sphincter pressure and impairing motility, altering gastric acid output and the gut microbiome, and harming the mucosal immune system (Rocco et al. 2014). While moderate alcohol consumption has been

connected with reduced inflammation and improved vaccination responses, chronic heavy drinking is associated with a lower frequency of lymphocytes and an increased risk of both bacterial and viral infections (Barr et al. 2016).

LIVER HEALTH

Alcoholic liver disease (ALD) is a leading cause of cirrhosis and liver-related death worldwide. Early discoveries of ALD have identified increased levels of bacterial endotoxins in the portal circulation. Alcohol consumption can disrupt the intestinal epithelial barrier and result in increased gut permeability and inflammation (Szabo 2015).

OVERALL WELL-BEING

According to the Centers for Disease Control and Prevention, approximately 88,000 Americans died of alcohol-related causes from 2006 through 2010, making excessive alcohol use the fourth leading preventable cause of death in the United States (Stahre et al. 2014). Here are some additional compelling stats on the worldwide impact of alcohol overuse, from the NIAAA website (2017):

- In 2010, alcohol misuse was the fifth leading risk factor for premature death and disability in the world.
- In 2012, 3.3 million global deaths were attributable to alcohol consumption.
- In 2014, the World Health Organization reported that alcohol contributed to more than 200 types of diseases and injury-related health conditions, including liver cirrhosis, cancers and injuries.

ALCOHOL USE DISORDER

Treating alcohol use disorder is a complex and challenging process, and the recovery process is a lifetime commitment. It often requires an integrative approach that may include residential treatment, medications, psychological and behavioral counseling, alternative medicine, support groups, and ongoing care from a physician (Mayo Clinic 2018).

Hold the Toast?

When it comes to drinking alcohol and expecting a health benefit, moderation is key. If your clients currently don't drink alcohol, it may be in their best interest not to start for any perceived "health benefits," as similar advantages can be achieved through living a healthy lifestyle that focuses on getting optimum amounts of sleep, managing stress, reducing exposure to environmental toxins, exercising regularly and eating a balanced diet.

GEOFF LECOVIN, MS, DC, NASM-CPT, CES, PES, FNS, WLS, *is a chiropractor, naturopathic physician and acupuncturist with master's degrees in nutrition and exercise science. He specializes in treating musculoskeletal pain and sports injuries at his clinic in Kirkland, Washington.*

REFERENCES

Agarwal, D.P. 2002. Cardioprotective effects of light–moderate consumption of alcohol: A review of putative mechanisms. *Alcohol and Alcoholism, 37* (5), 409–15.

AHA (American Heart Association). 2015. Alcohol and heart health. Accessed June 14, 2018: heart.org/HEARTORG/HealthyLiving/HealthyEating/Nutrition/Alcohol-and-Heart-Health_UCM_305173_Article.jsp#.WyLDKadKjIU.

Arranz, S., et al. 2012. Wine, beer, alcohol and polyphenols on cardiovascular disease and cancer. *Nutrients, 4* (7), 759–81.

Bagnardi, V., et al. 2015. Alcohol consumption and site-specific cancer risk: A comprehensive dose-response meta-analysis. *British Journal of Cancer, 112* (3), 580–93.

Barnes, M.J. 2014. Alcohol: Impact on sports performance and recovery in male athletes. *Sports Medicine, 44* (7), 909–19.

Barr, T.M., et al. 2016. Opposing effects of alcohol on the immune system. *Progress in Neuro-Psychopharmacology and Biological Psychiatry, 65,* 242–51.

Crews, F.T., & Vetreno, R.P. 2014. Neuroimmune basis of alcoholic brain damage. *International Review of Neurobiology, 118,* 315–57.

Dguzeh, U., et al. 2018. Alcoholism: A multi-systemic cellular insult to organs. *International Journal of Environmental Research and Public Health, 15* (6), 1083.

Dunbar, R.I., et al. 2017. Functional benefits of (modest) alcohol consumption. *Adaptive Human Behavior and Physiology, 3* (2), 118–33.

Duplanty, A.A., et al. 2017. Effect of acute alcohol ingestion on resistance exercise-induced mTORC1 signaling in human muscle. *The Journal of Strength & Conditioning Research, 31* (1), 54–61.

Jiménez-Pavón, D., et al. 2015. Effects of a moderate intake of beer on markers of hydration after exercise in the heat: A crossover study. *Journal of the International Society of Sports Nutrition, 12* (26).

Larsson, S.C., et al. 2016. Differing association of alcohol consumption with different stroke types: A systematic review and meta-analysis. *BMC Medicine.* Accessed June 19, 2018: bmcmedicine.biomedcentral.com/articles/10.1186/s12916-016-0721-4.

Mayo Clinic. 2018. Alcohol use disorder. Accessed June 18, 2018: mayoclinic.org/diseases-conditions/alcohol-use-disorder/diagnosis-treatment/drc-20369250.

Miller, M. 2017. Health benefits of moderate drinking may be overstated, study finds. *Penn State News.* Accessed June 18, 2018: news.psu.edu/story/469164/2017/05/24/research/health-benefits-moderate-drinking-may-be-overstated-study-finds.

NCADD (National Council on Alcoholism and Drug Dependence). 2015. Facts about alcohol. Accessed June 14, 2018: ncadd.org/about-addiction/alcohol/facts-about-alcohol.

NIAAA (National Institute on Alcohol Abuse and Alcoholism). 2017. Alcohol facts and statistics. Accessed June 14, 2018: niaaa.nih.gov/alcohol-health/overview-alcohol-consumption/alcohol-facts-and-statistics.

O'Keefe, J.H., et al. 2014. Alcohol and cardiovascular health: The dose makes the poison . . . or the remedy. *Mayo Clinic Proceedings, 89* (3), 382–93.

ONDCP (Office of National Drug Control Policy). 2017. *Changing the Language of Addiction.* Accessed June 18, 2018: whitehouse.gov/sites/whitehouse.gov/files/images/Memo%20-%20Changing%20Federal%20Terminology%20Regrading%20Substance%20Use%20and%20Substance%20Use%20Disorders.pdf.

Rocco, A., et al. 2014. Alcoholic disease: Liver and beyond. *World Journal of Gastroenterology, 20* (40), 14652–59.

Staff, J., & Maggs, J. 2017. Alcohol and cigarette use from ages 23 to 55: Links with health and well-being in the long-term national child development study. *Journal of Studies on Alcohol and Drugs, 78* (3), 394–403.

Stahre, M., et al. 2014. Contribution of excessive alcohol consumption to deaths and years of potential life lost in the United States. *Preventing Chronic Disease, 11,* e109.

Szabo, G. 2015. Gut–liver axis in alcoholic liver disease. *Gastroenterology, 148* (1), 30–36.

Topiwala, A., et al. 2017. Moderate alcohol consumption as risk factor for adverse brain outcomes and cognitive decline: Longitudinal cohort study. *BMJ, 357,* j2353.

Traversy, G., & Chaput, J-P. 2015. Alcohol consumption and obesity: An update. *Current Obesity Reports, 4* (1), 122–30.

USDHHS & USDA (U.S. Department of Health and Human Services & U.S. Department of Agriculture). 2015. *2015–2020 Dietary Guidelines for Americans.* Accessed June 18, 2018: health.gov/dietaryguidelines/2015/guidelines/, p. xiii.

Vella, L.D., & Cameron-Smith, D. 2010. Alcohol, athletic performance and recovery. *Nutrients, 2* (8), 781–89.

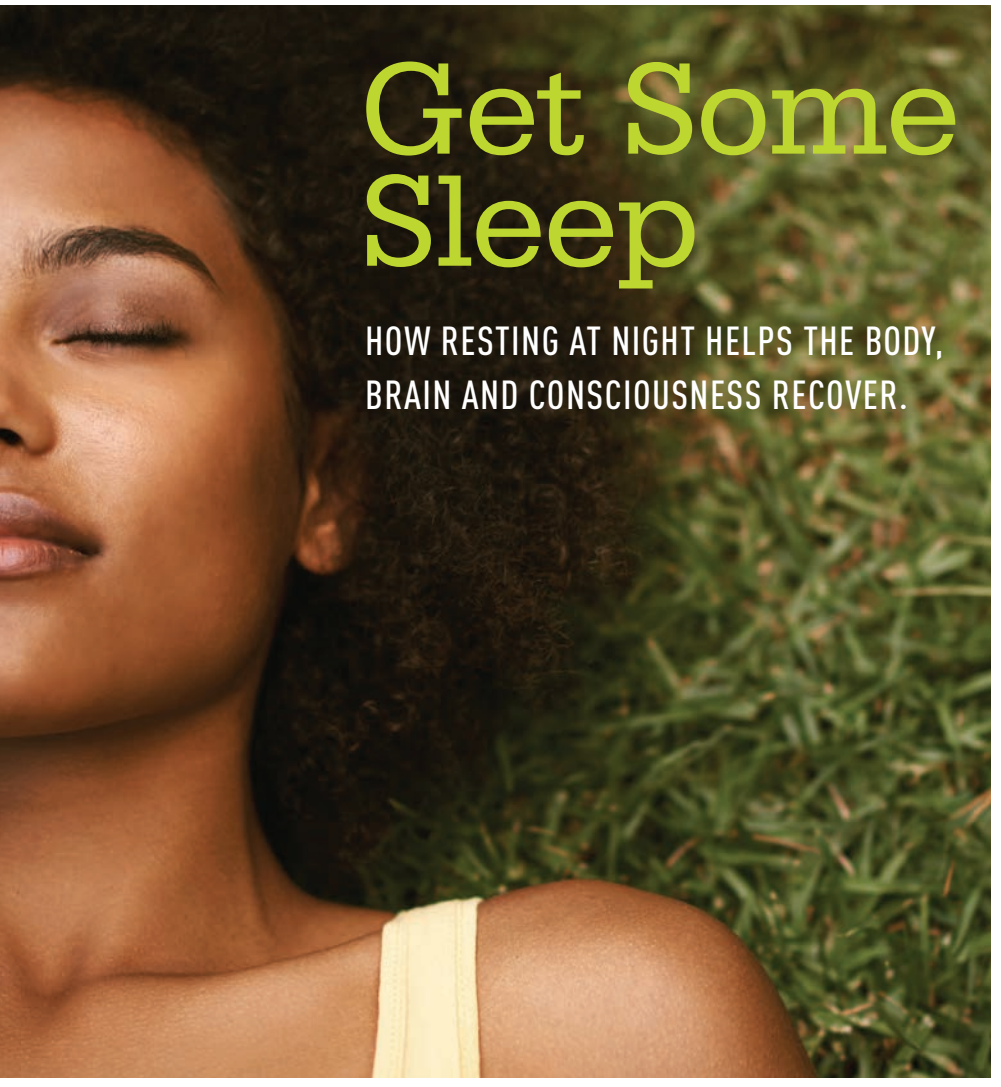
Key Terms

Alcohol use disorder: "a chronic relapsing brain disease characterized by an impaired ability to stop or control alcohol use despite adverse social, occupational, or health consequences" (NIAAA 2017). This term replaces *alcoholism*, *alcohol abuse* and *alcohol dependence*. Likewise, the word *alcoholic* should be replaced with "a person with alcohol use disorder" (ONDCP 2017).

Moderate drinking: "up to one drink per day for women and up to two drinks per day for men—and only by adults of legal drinking age" (USDHHS & USDA 2015).

One alcoholic drink: 12 ounces of beer, 4 ounces of wine, 1.5 ounces of 80-proof spirits or 1 ounce of 100-proof spirits (AHA 2015).


prAna
Join our
SUSTAINABILITY
MOVEMENT
Start asking questions about your clothes in the same way you ask about the food you eat, and you can help fundamentally change the way clothing is made.
Shop our collection of sustainable clothing for men and women at prana.com.



Get Some Sleep

HOW RESTING AT NIGHT HELPS THE BODY, BRAIN AND CONSCIOUSNESS RECOVER.

BY CHARLIE HOOLIHAN

Imagine you've found a training program scientifically guaranteed to promote weight loss, build muscle, and improve reaction time, cardiovascular function and mental clarity. There's only one catch: The program requires your clients to reduce their weekly training hours with you. Would you even consider recommending it?

Few trainers or coaches would suggest a regimen that would undermine the health of their business. And yet, fit pros could undermine the health of their clients by advising them to cut back on sleep to find more time to train. Sleep is fundamental to healing the tissue damage of exercise. Clients who don't get enough rest face a greater potential for illness, injuries and stalled progress.

Instead of advising clients to wake up an hour earlier 3 days a week, explain why reinforcing the importance of getting enough sleep could be the missing variable in their training program. This article addresses the inherent value of sleep and looks at the limits of sleep science.

Understanding Sleep Patterns

Sleep experts seem to agree that a broad range of 7–9 hours of sleep per night creates an optimal window for complete physical, mental and emotional restoration. Less than 6 hours per night, however, dramatically increases the chances of negative health conditions (Ohayon et al. 2017; Assefa et al. 2015).

In a good night's sleep, we cycle four or five times (or more) through various stages of sleep, each with specific qualities and purpose. A cycle lasts 70–90 minutes. These stages and cycles of sleep are just as important as overall sleep duration (if not more so). They all have restorative properties, and we need to spend a relatively equal amount of time in each stage (Winter 2018; Ohayon et al. 2017).

Three Phases of Sleep

For the purposes of this article, sleep can be grouped into three phases:

- **LIGHT SLEEP,** a transitional phase that mainly serves to settle the body into sleep;
- **DEEP SLEEP,** also called **SLOW-WAVE SLEEP** in which most physical recovery takes place; and
- **REM (RAPID EYE MOVEMENT) SLEEP,** which seems to provide for mental recovery.

Scientists identify these phases by measuring physiological variables such as electrical brain activity, blood pressure and eye movement. Brain waves offer the most definitive demarcation points because they are more consistently identifiable (Winter 2018; Ohayon et al. 2017)

Light Sleep

Light sleep consists of stages 1 and 2 of non-REM sleep. NREM 1 transitions us from wakefulness to sleep and lasts only a few minutes. Heartbeat, breathing and eye movements slow, and our muscles begin to relax. NREM 2 is still light sleep, but relaxation deepens, heartbeat slows further and body temperature drops.

Deep Sleep

Deep sleep takes place in stage 3 of non-REM sleep. In NREM 3, heartbeat and breathing slow to their lowest levels of the night. Likewise, brain waves become slow, and muscles are very relaxed (NINDS 2018).

Deep sleep conserves energy and rests the body's physiology. Restorative hormone activity increases: The release of growth hormone and other anabolic hormones boosts protein synthesis and tissue regeneration, while inflammatory and catabolic hormones are suppressed (Samuels 2008; Chennaoui et al. 2015; Fullagar et al. 2015).

REM Sleep

In REM sleep, which first occurs about 90 minutes after falling asleep (NINDS 2018), brain activity is more akin to that of a waking state. The hallmark rapid eye movements occur, blood pressure increases, and respiration speeds up (Kanda et al. 2016; Assefa et al. 2015; Winter 2018). It has been suggested that the brain and conscious mind recuperate during this active, dream-rich phase of sleep. A recent study discovered that the brain has a toxin-removal system that is activated during REM sleep (Assefa et al. 2015; Winter 2018).

Confronting Voluntary Sleep Restriction

Sleep restriction—cutting back to accomplish a goal—is fairly common in the fitness universe. Getting up earlier than usual to squeeze in a workout or add a second daily training session is prevalent, but it can trip up sleep patterns in ways that create potential health hazards (Assefa et al. 2015; Winter 2018; Kendall-Tackett 2010).

The key for fit pros is to help their clients optimize their sleep patterns to improve performance. That means considering sleep habits along with other training variables.

Establishing Individual Parameters

There are no hard-and-fast guidelines for how much sleep is sufficient, so each client must determine what is best for him or her. You can get a good idea of a client's optimum sleep pattern during an "offseason" or easy training cycle, when sleep restriction is not necessary. Ask your client to go to bed at the usual time and wake up without an alarm. Doing this for a week or so will normalize sleep needs, and the optimal number of hours should become apparent. This number can serve as the client's baseline (Winter 2018; Dement 2001).

Note that most of us have a built-in sleep/wake cycle called a circadian rhythm that responds to light and dark. This cycle will also become evident during the baseline examination. Circadian rhythm is just as important as sleep duration. Resetting this rhythm takes more effort than simply going to bed earlier when alarm-based, early-morning waking becomes a necessity again (Dement 2001; Winter 2018).

When possible, try to respect sleep duration and circadian rhythms, and structure training sessions around those needs (Samuels 2008).

Sleep Restriction Remedies

Since training is not most people's sole priority, you may be able to pair restrictions with "catch-up" sleep if training requirements cut into snooze time. A recent study found that the increased inflammatory markers caused by 4- and 6-hour nights of sleep returned to baseline after three nights with 9–10 hours (Killick et al. 2017).

Try to limit other inflammation sources like diet, workout intensity, work/school stress and recovery rates during programmed sleep restrictions (Thorburn, Macia & Mackay 2014; Kendall-Tackett 2010). For example, avoid restricting a student's sleep in March during exam week or an accountant's sleep in April at tax time.

Naps can normalize inflammatory markers, but how often people should nap and for how long depends on the individual. Recommendations for nap times range from 20 to 90 minutes, but the research is inconclusive (Faraut et al. 2015a; Faraut et al. 2015b; Milner & Cote 2009).

It's important to note here that most research into performance parameters and sleep requirements is limited, but most agree that the inflammatory nature of physical training requires even more sleep.

Prizing the Value of Sleep

Fit pros and clients alike often need a refresher on the intrinsic value of sleep. Here's a quick overview:

Weight management. Proper sleep improves hormone-related hunger response. The better we sleep, the lower the body's levels of the hormone ghrelin, which promotes appetite and plays a role in the pleasure we associate with eating. Leptin—the satiety hormone that tells us when we're full—increases with healthy sleep patterns. This increase helps us feel full sooner and therefore eat less. Research also indicates that people who have slept well have stronger impulse control (Winter 2018; Assefa et al. 2015).

Exercise enjoyment, adherence and performance. Energy levels increase with sufficient sleep, promoting more effective and enjoyable exercise sessions (Samuels 2008).

Heart health. Proper sleep improves cardiovascular function and lowers the risk of heart attacks, high blood pressure and stroke (Winter 2018; Assefa et al. 2015).

Inflammation control. Healthy sleep patterns significantly lower the risk of developing a wide variety of inflammatory conditions in muscle, joint and connective tissue. Moreover, sleep increases pain tolerance (Winter 2018; Assefa et al. 2015).

Hormonal output. A good night's sleep promotes effective repair, recovery and improvement of muscles and physiology through increases in anabolic muscle-building hormones like prolactin, testosterone and growth hormone. Sleep also decreases catabolic muscle-wasting hormones and inflammatory factors like cortisol, C-reactive protein and interleukin-6 (Assefa et al. 2015).

Brain improvements. Sleep improves cognitive capacity, decision-making and reaction times (Fullagar 2015).

Temperature regulation. Most importantly for participants in outdoor activities, healthy sleep preserves the body's ability to adapt to heat and cold through proper vasoconstriction and dilation (Chennaoui et al. 2015).

Immune response. Healthy sleep boosts immune function and physiological resilience, equipping the body to fight off a wide variety of affronts from colds, infections and other common illnesses. Sleep also helps the body respond to more serious health conditions, such as cancer and AIDS (Winter 2018; Kendall-Tackett 2010).

Emotional well-being. A good night's sleep is critical to a positive outlook on life. Overall mood improves, negative emotions decrease, and ratings of perceived exertion during exercise decline (Winter 2018; Assefa et al. 2015; Samuels 2008). Sleep also lowers the risk of mental illness, depression and bipolar disorders (Winter 2018; Dement 2001).

Sleep Hygiene—Preparation and Environment

Establishing individual sleep parameters is a great start, but you also need to ensure a proper sleep environment. The recommendations below come from *The Sleep Solution* (Berkley 2018) by Chris Winter, MD:

- Establish a consistent bedtime routine that promotes sleepiness, such as taking a warm bath, reading from a book and turning the lights out at a regular time.
- Avoid reading from a tablet or cellphone. The light from these devices appears to slow the production of melatonin, the hormone that initiates sleep.
- Write down thoughts in a notebook before bedtime to symbolically clear them from your mind.
- Create an extremely dark sleep space. Darkness stimulates melatonin production.
- Find a comfortable mattress with cozy bedding that suits individual preferences.
- Avoid consuming foods or drinks that can interfere with sleep. Products containing stimulants are obvious, but also be careful about alcohol: It helps people fall asleep, but when the body starts metabolizing alcohol midway through the night, sleep disturbance becomes rampant.
- Take the timing and type of meals into account. Generally, it's best to eat dinner more than 3 hours before bedtime. High-carbohydrate foods stimulate sleepiness, while high-protein foods have the opposite effect.

The Limits of Sleep Science

You'd think that something so beneficial and essential to healthy lives would be heavily researched with solid conclusions, standards and recommendations. But there's nothing simple about sleep—its many variables confound scientific research.

Sleep is a restorative process that requires numerous physiological, endocrinological and neuromuscular functions. Its capacity to restore brain physiology and consciousness leads to an even more complex set of scientific considerations (Kanda et al. 2016). These are some of the factors that complicate sleep research:

Industrial focus. Sleep research often emerges from studies examining aviation, industrial shift work, the military or other occupations that require severe changes in individual sleep patterns (Samuels 2008). Such studies typically focus on the negative physiological consequences of sleep deprivation resulting from job requirements and time schedules. Extrapolating these conclusions to other populations can be problematic.

Techniques and methodologies. Accurate sleep studies are difficult because the major methods of reporting on sleep quality have inherent limitations. Self-reported journals depend on observations from people who have lost consciousness, undermining their reliability. Thanks to technological advances, lab-based polysomnographs can measure numerous physiological responses via sensors on the scalp, temples, chest, ears and legs in a laboratory (Meltzer et al. 2015), but this invasive process cannot be considered normal sleep for most.

Recently, personal actigraphs—small, portable motion-sensing devices like a Fitbit device or smartwatch—have added functions to estimate sleep quality, but they have proven less accurate than polysomnographs (Meltzer et al. 2015).

Considering the multitude of health benefits from proper sleep, trainers and coaches should take time to educate clients and athletes about sleep's critical link to performance. That means becoming more attuned to their individual sleep requirements.

CHARLIE HOOLIHAN *is an NASM-CES, PES, with more than 40 years' experience training athletes at all distances of competition, from swimming and track sprints to IRONMAN Triathlons®. He is the personal training director at Pelican Athletic Club in Mandeville, Louisiana. Contact him at charlie@thepac.com.*

REFERENCES

Assefa, S.Z., et al. 2015. The functions of sleep. *AIMS Neuroscience, 2* (3), 155–71.

Dement, W.C. 2001 *The Promise of Sleep: A Pioneer in Sleep Medicine Explores the Vital Connection Between Health, Happiness, and a Good Night's Sleep*. New York: Dell Trade.

Chennaoui, M., et al. 2015. Sleep and exercise: A reciprocal issue? *Sleep Medicine Reviews, 20*, 59–72.

Faraut, B., et al. 2015a. Napping reverses increased pain sensitivity due to sleep restriction. *PLOS One, 10* (2), e0117425.

Faraut, B., et al. 2015b. Napping reverses the salivary interleukin-6 and urinary norepinephrine changes induced by sleep restriction. *The Journal of Clinical Endocrinology & Metabolism, 100* (3), E416–26.

Fullagar, H.H., et al. 2015. Sleep and athletic performance: The effects of sleep loss on exercise performance, and physiological and cognitive responses to exercise. *Sports Medicine, 45* (2), 161–86.

Kanda, T., et al. 2016. Sleep as a biological problem: An overview of frontiers in sleep research. *The Journal of Physiological Sciences, 66* (1), 1–13.

Kendall-Tackett, K.A. (Ed.). 2010. *The Psychoneuroimmunology of Chronic Disease: Exploring the Links between Inflammation, Stress, and Illness*. American Psychological Association. Washington, D.C.: APA.

Killick, R., et al. 2017. Metabolic and hormonal effects of 'catch-up' sleep in men with chronic, repetitive, lifestyle-driven sleep restriction. *Clinical Endocrinology, 83* (4), 498–507.

Meltzer, L.J., et al. 2015. Comparison of a commercial accelerometer with polysomnography and actigraphy in children and adolescents. *Sleep, 38* (8), 1323–30.

Milner, C.E., & Cote, K.A. 2009. Benefits of napping in healthy adults: Impact of nap length, time of day, age, and experience with napping. *Journal of Sleep Research, 18* (2), 272–81.

NINDS (National Institute of Neurological Disorders and Stroke). 2018. Brain basics: Understanding sleep. Accessed Aug. 16, 2018: ninds.nih.gov/Disorders/Patient-Caregiver-Education/Understanding-Sleep.

Ohayon, M., et al. 2017. National Sleep Foundation's sleep quality recommendations: First report. *Sleep Health, 3* (1), 6–19.

Samuels, C. 2008. Sleep, recovery, and performance: The new frontier in high-performance athletics. *Neurologic Clinics, 26* (1), 169–80.

Thorburn, A.N., Macia, L., & Mackay, C.R. 2014. Diet, metabolites, and 'western-lifestyle' inflammatory diseases. *Immunity, 40* (6), 833–42.

Winter, W.C. 2018. *The Sleep Solution: Why Your Sleep Is Broken and How to Fix It*. New York: Berkley.

BY TONY NUÑEZ, PHD

Q+A

YOU ASK, WE ANSWER

WHAT DOES CURRENT RESEARCH SAY ABOUT THE VALIDITY OF WEARABLES, SLOW RESISTANCE TRAINING FOR OLDER ADULTS AND THE EFFECT OF OVERNIGHT FASTING ON EXERCISE INTENSITY?

HOW ACCURATE ARE WEARABLE ACTIVITY MONITORS?

Activity trackers (ATs) and heart rate (HR) monitors have become increasingly popular. There are lots of choices, and the selection process depends on many variables, including accuracy.

Researchers tested eight wearable devices (Apple Watch Series 2, Fitbit Blaze™, Fitbit Charge 2™, Garmin vivosmart® HR, TomTom Touch, Polar® A360, Polar® HR7 and Bose® SoundSport Pulse headphones). All eight offered HR monitoring, and all except for the Bose headphones claimed to estimate caloric expenditure. The study's goal: to assess how accurately the devices measured HR and activity during cycling and resistance training.

Fifty subjects (28 females, aged 23 ± 3; 22 males, aged 22 ± 3) took part in both exercise modes in a randomized order, testing all eight activity trackers. The volunteers were also connected to "gold standard" devices—an electrocardiogram to measure HR and a metabolic gas analyzer to estimate caloric expenditure. Using scientifically validated statistical analysis, researchers then compared HR and (when applicable) caloric expenditure data from the wearables with those reported by the gold standard devices.

Results revealed that, for HR monitoring, Polar HR7 and Bose SoundSport Pulse headphones met the validity standard (having a mean absolute percent error value ≤10%) during both cycling and resistance training; the Apple Watch Series 2 was the most accurate during cycling; and the Bose headphones performed best during resistance training.

No devices accurately estimated caloric expenditure, which is an important point for clients who are tracking calories for fat loss.

REFERENCE: Boudreaux, B.D., et al. 2018. Validity of wearable activity monitors during cycling and resistance exercise. *Medicine & Science in Sports & Exercise, 50* (3), 624–33.

DOES SLOW RESISTANCE TRAINING IMPROVE MUSCLE MASS IN OLDER ADULTS?

Older-adult clients often need to increase their strength. Current resistance training guidelines recommend loads between 60% and 80% of one-repetition maximum, which may not be realistic for some. A possible alternative or addition is slow resistance body-weight training (SRT-BW).

Researchers hypothesized that as few as three body-weight exercises (squat, modified pushup, abdominal crunch) performed slowly (4 seconds eccentric, 4 seconds concentric) could improve muscle mass, strength and fat distribution in seniors. Forty-two subjects (25 males, 17 females), 70 years old or older, trained for 12 weeks. One session per week was supervised, and participants were asked to perform SRT-BW every day (2 sets of 10 reps to start, progressing by 2 reps for each move every 4 weeks).

By the end of the trial, subjects saw improvements in muscle mass (thigh-muscle thickness), strength (knee extension, hip flexion) and body composition (abdominal fat, thigh-fat thickness and waist circumference), compared with baseline. Trainers may want to implement some type of in-home SRT-BW training days to improve strength in older-adult clients.

REFERENCE: Tsuzuku, S., et al. 2018. Slow movement resistance training using body weight improves muscle mass in the elderly: A randomized controlled trial. *Scandinavian Journal of Medicine & Sports in Science, 28* (4), 1339–44.

HOW DOES OVERNIGHT FASTING AFFECT EXERCISE INTENSITY?

People have performed fasted cardio for years, but there is minimal research on how it compares with carbohydrate-supplemented cardio in respect to exercise duration, power output and important blood markers. In particular, data has been lacking on differences in sprint-interval training performance while fasted (SIT_{FAST}) versus carbohydrate-supplemented (SIT_{CHO}).

Researchers wanted to understand the effects of SIT_{FAST} ($n = 11$) and SIT_{CHO} ($n = 9$) when performed 3 days per week for 4 weeks by well-trained cyclists (aged 18–45). Training began with four SIT bouts (30-second sprint, 4-minute recovery) and increased by one bout per week. Participants performed aerobic capacity and time-to-exhaustion tests on a bike before and after the training. SIT_{FAST} cyclists trained after a minimum 10-hour fast, while the SIT_{CHO} group consumed breakfast (2.5 grams of carbohydrate per kilogram of body weight) before the training and drank a 20-ounce Gatorade drink during the workout.

The SIT_{CHO} group exhibited higher work and peak power outputs than the SIT_{FAST} group during training. Nonetheless, the SIT_{FAST} group had longer time-to-exhaustion durations and distances than the SIT_{CHO} group following training. Researchers suggested that improved aerobic enzyme activity during SIT_{FAST} training may have led to greater improvements in aerobic endurance.

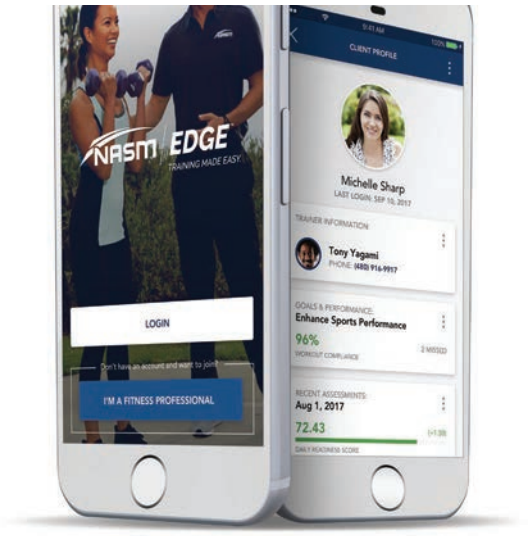
REFERENCE: Terada, T., et al. 2018. Overnight fasting compromises exercise intensity and volume during sprint interval training but improves high-intensity aerobic endurance. *The Journal of Sports Medicine and Physical Fitness,* doi:10.23736/S0022-4707.18.08281-6.

TONY P. NUÑEZ, PHD, *Tony P. Nuñez, PhD, is an assistant professor of human performance and sport at the Metropolitan State University of Denver. He is an active researcher and presenter in the exercise physiology and fitness field.*

Have a question for our expert? Send it to AmericanFitness@nasm.org.

Introducing NASM Edge.

A personal training app so powerful, it will change the way you train forever.



With NASM Edge, there's no more guesswork, and no more paperwork. Everything you need to keep your clients and your career organized and on course is all included in one easy-to-use app.

Here are just some of its game-changing features:

Instant Workouts

NASM Edge takes the guesswork out of program design, and helps you produce consistent and remarkable results for your clients.

Unlimited Access to Exercise Videos

Dive into a vast library of video demonstrations, designed by NASM's experts.

Simplify Client Management and Maximize Your Business

Eliminate paperwork with assessments, measurements and progress tracking, all in one place.

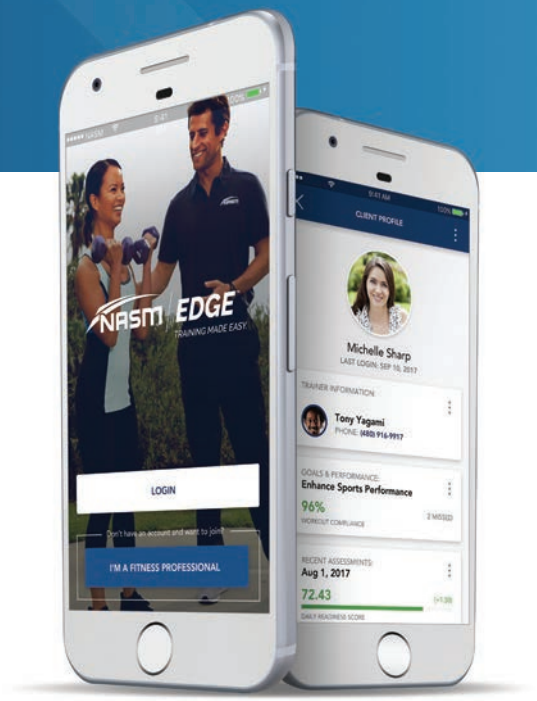
Try it FREE for 30 days. Download NASM Edge from the App Store now!

Download on the App Store

ANDROID APP ON Google play

Use the camera on your smart phone to scan the code and be directed to the app store.

NASM | EDGE™
TRAINING MADE EASY.



Introducing NASM Edge.

A personal training app so powerful, it will change the way you train forever.

With NASM Edge, there's no more guesswork, and no more paperwork. Everything you need to keep your clients and your career organized and on course is all included in one easy-to-use app.

Here are just some of its game-changing features:

Instant Workouts

NASM Edge takes the guesswork out of program design, and helps you produce consistent and remarkable results for your clients.

Unlimited Access to Exercise Videos

Dive into a vast library of video demonstrations, designed by NASM's experts.

Simplify Client Management and Maximize Your Business

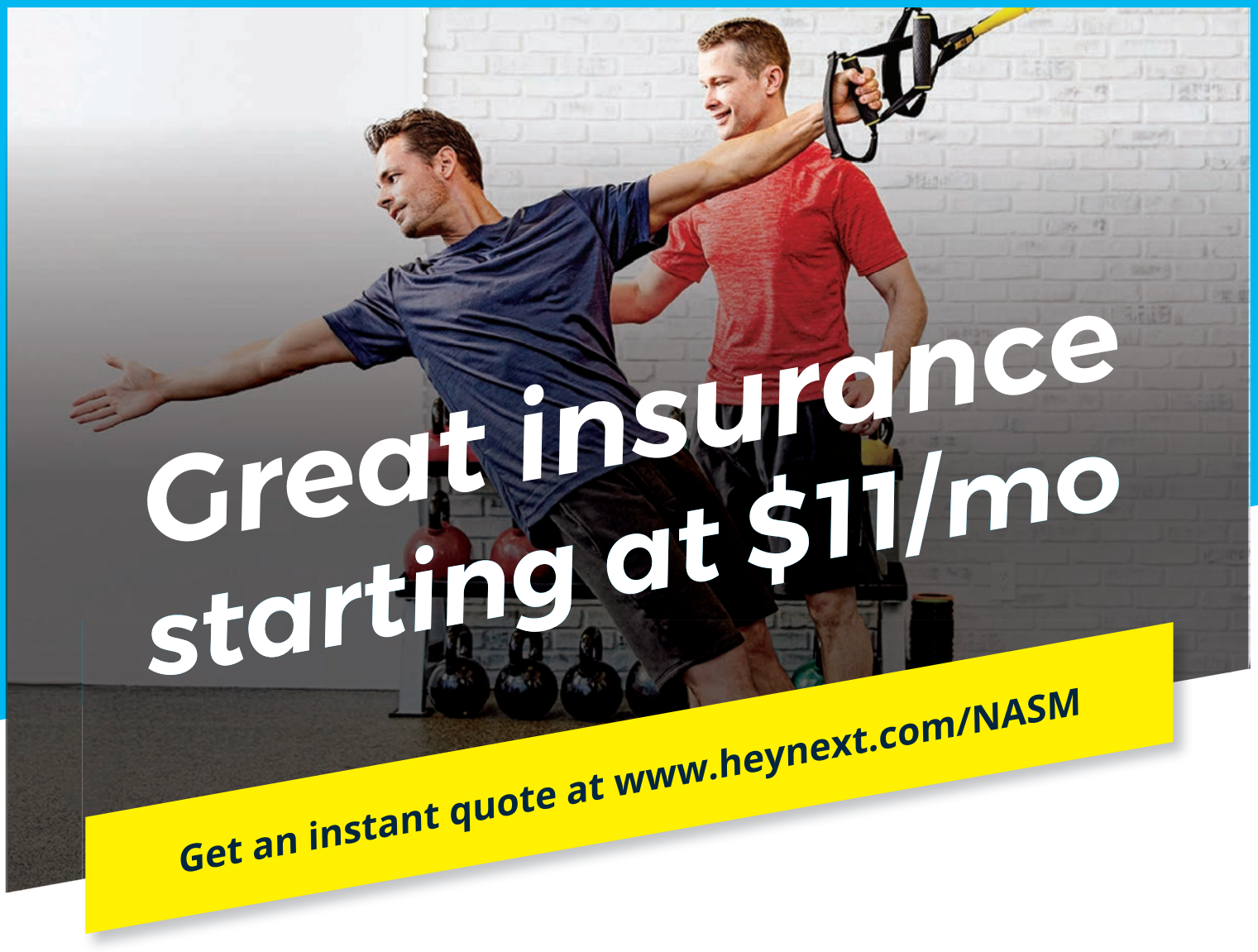
Eliminate paperwork with assessments, measurements and progress tracking, all in one place.

Try it FREE for 30 days. Download NASM Edge from the App Store now!

Download on the App Store

ANDROID APP ON Google play

Use the camera on your smart phone to scan the code and be directed to the app store.



Arming you with the edge to thrive

Tools to take advantage of every opportunity

Starting a new job tomorrow? Download Proof of Insurance instantly online for free.

The confidence of great coverage

We apply the best of what technology has to offer - so you only pay for coverage you need.

An ally to help you succeed

Insurance is a relationship, not a transaction. We don't disappear after you hit the "Pay" button.

NEXT INSURANCE

Reinventing insurance for personal trainers