BE A LIFELONG LEARNER!

MICHAEL PIERCY

Rhabdomyolysis
What You Need To Know

SUMMER 2019
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SUMMER 2019

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SHINING YOUR LIGHT

Oh, the joys of summer! The days are longer, the weather is welcoming, and the season is right for fun vacations and relaxed attitudes. At the same time, your clients are counting on you to keep them on track with the healthy changes you’ve helped them make since the start of the year. As an educated fitness professional, you are ready to motivate!

In this issue, we have several in-depth articles that give you the keys you need to help your clients achieve their wide-ranging goals. Rhabdomyolysis expert Joe Cannon, MS, explains why there is such a thing as too much intensity (page 40), and we explore the many reasons why you need to keep current with your continuing education, especially when working with special populations.

In our newest CEU Corner, “Working Through Cancer: Exercise as a Part of Recovery” (page 20), we talk to experts about the right ways to engage and motivate clients who are recovering from breast cancer. Research verifies that exercise can help those coming back from this insidious disease, but it’s crucial to know your limitations and be fully present. If you want to work with this population, it’s essential to pursue a solid education in the finer points of cancer, its treatment, and its effects on the body, both short- and long-term.

On the business side, we explain why it’s important to be mindful and measured when introducing your clients to the latest and greatest techniques (page 16). The point is to train the individual in front of you. NASM Master Trainer Kyle Stull, DHSC, MS, touches on this idea as he reviews the lower kinetic chain and how a simple step-by-step approach to assessment and corrective programming can make all the difference. Look for this article on page 47 and implement the strategies with your clients.

When it comes to shining brightly and fully showing up, Michael Piercy, MS, the subject of this issue’s cover story, is a stellar example and a respected leader. “Fitness is too important to be boring,” he says (page 32). “Break down walls by creating laughter and joy.” Piercy has reinvented himself several times, and his insatiable hunger for knowledge—and for sharing that knowledge with clients and other fitness professionals—fuels his passion.

We know you are also passionate about your purpose, and we remain committed to providing you with top-tier education and support. Share your success stories with us!

Yours in health,

Laurie McCartney
President – Global Fitness & Wellness Solutions

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In recent news published in the *Journal of Orthopaedic & Sports Physical Therapy*, researchers who examined previous studies on concussion concluded that increasing neck strength “could substantially reduce risk or severity of injury or outcomes” (2019; 49 [3], 202–8).

“A concussion is when the head gets rattled like a little bobble doll,” says NASM Master Instructor Fabio Comana, MA, MS, NASM-CPT, CES, PES. “If I have strong muscles stabilizing the head, like when heading a soccer ball or during a collision, it doesn’t bobble as much.”

Though Comana agrees with the research team’s recommendations to do a pain screen, postural assessments and neck exercises, he suggests adding a step. “Depending on the assessments, you may need to do corrective exercise before you go to strengthening,” he says. Here is his recommendation, based on the NASM corrective exercise approach:

**Assess for pain.** Cue the client with these moves: Sit upright and lower the chin to touch the chest, then tilt the head back (face nearly parallel to floor); bring the head back to neutral and turn once to each side (chin to collarbone). Clients who have pain with any of these motions should see a physical therapist or a physician.

**Assess posture.** Have the client stand with the back against a wall and pull the shoulder blades back so they are flat, opening up the chest. Now look at the person from the side. The mastoid process (the bone right behind the ear) should align directly over the acromion process (the bump at the end of the clavicle or shoulder blade).

“Many people have a forward-head position,” says Comana. If so, corrective exercise should be performed to restore balance in the postural muscles before moving on to strengthening.

**Recommend corrective exercise as needed.** A simple exercise Comana recommends is to tell the client to pretend you accidentally got dog poo on your hand—and then put your hand in front of the client’s nose. The person will instinctively pull back the head into proper alignment. “This [movement] should be done repeatedly throughout the day; not just once and done,” he adds. Comana has clients put a checkmark in a notepad every time they do this exercise between sessions. (Additional moves are detailed in the NASM Corrective Exercise Specialization program.)

**Build neck strength.** Rather than doing “neck exercises,” which often don’t involve much range of motion, Comana suggests focusing on compound lifts that happen to build neck strength, such as the deadlift and shoulder press. As always, following the NASM OPT™ model, Comana recommends “unloaded then loaded then exploded” training. “Don’t progress clients unless they earn the right to progress,” he says.
Summertime often means more people are in pursuit of the elusive “six-pack.” There are a few problems with that, says Mike Fantigrassi, NASM-CPT and Master Instructor. “One of the sayings is ‘Abs are made in the kitchen,’ and it’s really true. To see your abs, it boils down to nutrition. Clients need to know that.” Here are a few other things to keep in mind when helping clients target their abs:

**Timing.** Most people spend 15 minutes on abs, when they only need to devote 2 or 3. Also, they work the abs daily, which does not give muscles time to recover. Lower-intensity exercises—like planks—can be done daily or be used in a warmup or active recovery between exercise sets, but the protocol for ab work is 1–4 moves, 1–4 sets, 3 days a week.

**Assessment.** Some ab exercises can worsen muscle imbalances. For example, if hip flexors are tight from too much sitting, full situps will engage those muscles more than the abs. And clients whose hip flexors are already strong, such as cyclists, don’t need to strengthen them further.

**Exercise selection.** As with any other move, consider what muscles you want to target. Many people focus too much on the rectus abdominis and the “lower abs,” which they try to target with leg levers and flutter kicks. Guide clients to include moves that target the internal and external obliques and transverse abdominis, as well.

**Cuing.** If a client’s belly is puffing out during a crunching move, the client is not drawing the belly in. This drawing-in action has been shown to activate both local and global stabilization systems in the body. Also check for a forward-protruding head and cue for posture corrections.

---

**SAMPLE ABS PROGRESSION VIA THE NASM OPT™ MODEL**

Below is a progressive core-exercise program based on guidelines in the NASM Optimum Performance Training™ model:

**CORE STABILIZATION**
- plank
- dead bug
- stability ball rollout or “stir the pot”
- plank and saw motion with TRX® Suspension Trainer™

**CORE STRENGTH**
- floor crunch or curl-up
- ball crunch
- reverse crunch
- cable rotation (twist)
- medicine ball twist (V seat)

**CORE POWER**
- floor or stability ball situp with medicine ball throw
- rotation chest pass
- medicine ball twist-and-slam
- standing twist-and-throw (ball against wall)

---

**NUTRITION CERTIFICATION FOR THE WIN**

If abs are made in the kitchen, serve up results for your clients by becoming an NASM Certified Nutrition Coach. In this state-of-the-art interactive program, you’ll learn how to put your clients on the healthiest route toward their best selves. Find out more at nasm.org/cnc.
Everyone! The average adult’s head weighs 10–12 pounds. “It’s a big ball, and the best place to balance it—the fulcrum—is over the C1 and C2 axis in the cervical spine. If the head is off balance, shifted forward just 30 degrees, like from 12 p.m. to 1 p.m. on the clock face, the head now weighs 40 pounds,” says NASM Master Instructor Fabio Comana. “That’s why a forward shift—as in upper crossed syndrome—can be very problematic.”

Why (and How) to Put More “You” Into Your Business

Danielle Gray, NASM-CPT, knows what it means to build a business around a personal passion. She began gymnastics when she was 4 years old, competed on the Junior Olympic team and later became a gymnastics coach. Today, her business—Train Like a Gymnast—centers on applying the lessons she learned to clients with all types of fitness interests and goals.

“Putting yourself into your business can equal success for many reasons,” she says. “When you’re in business, you need a niche. Many people are used to ‘fitting in’ because that means survival, but in the business world, you want to stand out. Otherwise you get lost.”

Though creating a niche business may narrow the types of clients you work with, Gray says the payoff in working with likeminded people is both personal and professional: She’s found that not only does she feel more connected to her clients, but her authenticity has created a level of trust that has increased client retention rates and referrals. Not everyone may have quite so obvious a niche as she did, but she says all fit pros can differentiate themselves from the pack by tapping into their truest selves.

“The first step is to think of how you train,” she says. “Why do you train the way you do? What do you love about it? You’ll have passion there because it’s what you love to do. Spread that joy!”

To see how Gray built upon her passion, visit trainlikeagymnast.com.

Who’s Got a Big Head?

How Many Minutes of Daily Exercise Will Get You to Age 90?

Two researchers from the Netherlands examined data from the Netherlands Cohort Study, specifically looking at 5,479 people born in 1916–1917. The study kept tabs on various factors, including physical activity, from age 20 until age 90 or death, whichever came first (1986–2007).

The results, published in the Journal of Epidemiology & Community Health, were different for women than for men. Men who exercised for 90 or more minutes a day were 39% more likely to reach age 90 than those doing less than a half-hour. For men, more exercise time meant better odds. For women, though, 60 minutes a day seemed to be the sweet spot for becoming a nonagenarian: Doing more or less was associated with a lower likelihood of reaching that milestone.
COULD AEROBIC EXERCISE = GREATER COLLEGE SUCCESS?

In research published this year in *Neurology*, Columbia University professor Yaakov Stern, PhD, et al. studied a group of 132 adult men and women (2019; 2019; 92 [9]). All were classified as “cognitively normal” and “below median aerobic capacity.”

Participants were divided between two training programs: One focused on aerobic exercise, and the other on stretching/toning. Both programs ran for 6 months, with workouts four times per week. Before and after the interventions, researchers measured a variety of factors, including cognitive function, aerobic capacity, body mass index and cortical thickness, which has been associated with higher general intelligence scores (*Intelligence*, 2013; 41 [5], 597–606).

All ages of aerobic exercisers showed improvements in cognition, which includes executive function, episodic memory, processing speed, language and attention. While the effect on executive function was more pronounced with age, the researchers noted in their conclusion, “Increased cortical thickness suggests that aerobic exercise contributes to brain health in individuals as young as age 20.”

For fitness professionals working to motivate college students, those who are GPA-focused could be interested in knowing they may perform better academically if they don’t skip workouts to study. (Perhaps an hour less of Netflix would be a better tradeoff.)

Danielle Gray, NASM-CPT, from Train Like a Gymnast, shares a strategy from her own college days that may help keep students moving between training sessions: Enroll in a physical education class each semester. “I knew if I scheduled it into my courses, I would make time for it,” she says.

BRUSH UP ON KIDS’ PHYSICAL ACTIVITY GUIDELINES

In the recently updated *Physical Activity Guidelines for Americans* (2018; 2nd ed.), published by the U.S. Department of Health and Human Services, Chapter 3 is dedicated to exercise for children and adolescents. As in the previous edition, guidelines are spelled out in terms of timing, intensity and duration. But a key component is not mentioned: the importance of establishing a foundation of healthy movement patterns, posture and exercise form, as recommended by the NASM Optimum Performance Training™ model.

How to adapt the model to kids? The NASM Youth Exercise Specialization (YES) course (1.0 NASM CEUs) offers guidelines not only on doing that but on adapting assessments, SAQ training and even motivational approaches—all of which are a bit different for children.

Here, for example, are the guidelines for resistance training:

<table>
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<th>RESISTANCE TRAINING GENERAL GUIDELINES FOR CHILDREN 6–19</th>
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To learn more about the YES program, visit nasm.org/products/CEU142K.

GX NEWS: TURN YOUR GYM TRIBE INTO A ROWING CREW

Recently, Technogym™—an official supplier of seven Olympic Games—reimagined indoor rowing machines and came up with SKILLROW™. This innovative machine can be used solo, of course, but Technogym also created a SKILLROWING class program that turns the activity into a unique group experience.

With the UNITY™ SELF SKILLROW app and kiosk, instructors select from a library of class profiles or create their own programs, adjusting elements such as power, heart rate or strokes per minute. (The program allows you to manage the microphone and music, too.) Class members simply follow the rowing
Get ’Em Back in the Game ... Safely

Working with competitive athletes who have been sidelined by an injury can be tough. Psychologically, a certified trainer can help them avoid negative thinking and remind them to focus on the goals their doctor suggests now. Physically, it’s more complicated: “During this time, it is important the sports performance professional not lose focus on maintaining the uninjured areas of the athlete. Doing so can lead to dysfunction and the potential for injury to those adjacent body parts,” according to NASM Essentials of Sports Performance Training (Jones & Bartlett Learning 2019).

To make this transition as safe as possible, the Performance Enhancement Specialization offers protocols to help you know when it’s safe to work the traumatized area and what to avoid when you do. Also, the fitness pro must work in close concert with the athlete’s sports medicine staff to ensure that training coordinates with treatment. Here’s a summary of the stages:

Stage 1: The sports performance professional only works on the nontraumatized muscles using isolateral or single-limb training.

Stage 2: After the athlete regains pain-free range of motion in the traumatized area (and receives medical clearance), progressive strength training can begin (with little stress on joints).

Stage 3: The focus changes to returning the athlete to baseline (or better). Strength exercises continue, and metabolic conditioning begins.

The injury-recovery process is complete when all of these apply:

• Movement is pain-free.
• No swelling is noticeable.
• Full ROM of the joint/muscle is restored.
• Strength reaches or exceeds preinjury levels.
• Metabolic fitness is reestablished enough for the athlete to safely return to play.

Electrify Your Purpose at Optima 2019

As an NASM/AFAA fitness professional, you are dedicated to helping people transform their lives—but what about your own transformation? Set aside a weekend this fall for the ultimate fitness education experience that will boost your personal and professional growth to new levels. The NASM and AFAA Optima 2019 Conference is celebrating 5 years of delivering the finer details that make a fitness professional stand out among the crowd.

“I think one of the wonderful things about Optima is the opportunity to network, to meet people like yourself, to learn from others, to get the very best access to education, and also to be a part of our product development team by informing and learning from each other [so we] take NASM to the next level,” says Laurie McCartney, president, Global Fitness & Wellness Solutions. Highlights from this year’s event:

• Keynote speaker Chris Powell, host of Extreme Weight Loss, who will share expert tips on “The Transformation of Coaching.”
• Morning workouts with top professionals in the industry.
• A chance to learn more about the latest in health and fitness products, technology and apparel in the well-targeted expo hall.
• An opportunity to earn up to 2.0 NASM/15 AFAA continuing education credits (when attending the preconference sessions and full 3-day conference).
• More than 60 breakout sessions that will elevate your training and instructing game: Topics will include metabolic adaptations, training variability, corrective exercise solutions, small-group business success and much more.

ADDITIONAL DETAILS
Where: Arizona Grand Resort & Spa
When: September 26–29, 2019
Contact: NASMoptima.com

LAURA QUAGLIO is kicking off summer with a walking tour of Europe and is curious to see just how many steps she’ll rack up on her Apple Watch. She’s looking forward to her gym’s new “Fresh Air” stationary bike class, held outside a local mall. Pass the sunscreen, please!
INSTRUCTOR NOTES SHARPENING YOUR SKILLS

NAVIGATING THE PATH TO FITNESS PRESENTER

Begin the journey by discovering the what, when, where and how of sharing your expertise with fitness colleagues.

BY SARAH SCHRENK, MS

As a group fitness instructor, you excel at leading and educating. Have you ever fantasized about taking your expertise beyond the confines of the studio? Take a moment to recall an engaging presenter at the last fitness education event you attended. This person—probably a fitness industry veteran with a passion for educating fellow fitness professionals—had experience and credentials, communicated well, and captured the group’s attention. Did you walk away thinking you, too, might like to be a “trainer of the trainers”? Many fitness professionals easily envision themselves on the stage, but the path to making it a reality has many steps.

First Steps
Begin the journey by reviewing your qualifications, along with the pros and cons of being a presenter or master trainer.

YOUR TOPICS AND QUALIFICATIONS. What do you want to present, and what, exactly, is your area of expertise? Just about any aspect of group fitness is fair game: functional training, active aging, mind-body, recovery, prechoreographed programs, business, leadership, aquatic fitness, and evergreen topics such as step aerobics and indoor cycling. Is your knowledge appropriate for those who are new to the fitness industry, for seasoned pros or for both?

Next, look at your qualifications. You will need to have a current nationally recognized fitness certification—your NASM/AFAA certification is a perfect ally. Sometimes you need a degree in your field of expertise or a minimum number of years in the fitness industry.

ADVANTAGES AND CONSIDERATIONS. After thinking of what you can offer, give equal weight to what you will gain and how those advantages blend with your lifestyle. Presenting can expand your network, build your résumé and develop your communication skills. Erin Scott, 2018 Beachbody® LIVE Master Trainer of the Year, from Fairhope, Alabama, gets to live her passion of sharing fitness and building relationships with new group fitness instructors. “It’s an opportunity to educate the future of fitness,” she says.

Fitness presenting often provides the opportunity to travel. It’s very exciting to visit new cities and experience different fitness facilities. But a presenter is usually paid only for the event, not for travel time on either end. How far are you willing to drive, or how many hours do you want to spend in airports? Most fitness education events are held on the weekend. Contemplate
what you will miss doing with your family and friends, or what classes and clients you might have to give up if you’re no longer available on Saturdays and Sundays. If you work during the week, calculate the number of hours presenting and travel will add to your workload.

One of the most rewarding aspects of presenting is meeting many other fitness professionals. They have intriguing stories of fitness journeys and share a common interest with you.

You may also have repeat attendees, which can lead to an expanded network or even friendships. But what if you have an unhappy customer? Anticipate how you will handle a participant who does not get what she expects from the event (but touch base with the event organizer first).

Are you still in? You can present education that you’ve created, or you can represent an established fitness product or brand. Either approach may make you eligible to present at a conference.

Create Your Own Workshops
If you have a unique topic or unique intellectual property, develop your own educational offerings. Keep in mind, however, that you are responsible for every aspect, from conception to presentation. How big is your fitness network? Are there enough places in a wide geographical area to hold your events? There is a finite number of fitness professionals in any one region, so beware of oversaturating the market. In addition, how are your marketing skills? You need to spread the word about the events and get people excited enough to register. If you plan to present long-term, you’ll need to continually develop new content to get repeat customers.

One way to reach more participants is to offer web-based education in addition to in-person events. You can develop a webinar or an online program or offer a live workshop that people participate in virtually. Ponder whether you have the technological skills and equipment to go this route.

Fitness professionals are more likely to register for an event if they get continuing education credits, so the next step is to become a continuing education provider. Develop clear objectives and an outline for each workshop. The content must be credible and in a relevant subject area, and the presenter needs to have appropriate credentials. Fitness certification agencies have provider applications on their websites. Carefully review the yearly fees and the deadlines for each agency and type of workshop. You’ll need to renew your status each year. You’ll also need to keep attendance records in case participants lose their certificates of completion.

Think about what you will charge. You aren’t just covering the expenses of the workshop and continuing education credits; you also need to factor in hotels, flights, meals and rental cars or mileage. How do you put a price on your time? Determine the overall return on investment from the whole process.

Become a Representative
Presenting for an established fitness product or brand is another option. Most of the educational content is created by the company or organization, not the presenter or master trainer. The company has the intellectual property, the outline and the objectives and is usually approved as a continuing education provider. In addition, the company often has name recognition, which leads fitness professionals to register for an event regardless of the presenter.

Look for presenter requirements or applications on company websites so you can see what education or certification is needed. It’s common for companies to require applicants to have completed the company’s education events, to have taught that modality for a minimum number of years and to submit a teaching video. After you submit your application, you—along with likely hundreds of other fitness professionals—can hope to be selected for an interview or audition. Organizations are not looking for professionals who meet the

What do you want to present, and what, exactly, is your area of expertise?

Presenter Readiness Checklist

Advantages
- sharing your passion
- meeting many fitness professionals
- expanding your network
- building your résumé
- developing your communication skills
- enjoying opportunities for travel

Considerations
- subject expertise requirements
- need for “edutainer” skills
- travel time without compensation
- time away from family and friends
- hours added to current workload
- unhappy customers
- competition with other presenters

SUMMER 2019 / AMERICAN FITNESS
minimum requirements; they want people who shine. Do your ambition and desire stand out? Can you “edutain”—meaning, can you offer excellent education while holding the audience’s attention?

If you are chosen to apprentice, you’ll begin a process that can take several months. Expect to attend training events at your own expense. You might present at an educational event with a more experienced presenter, who will evaluate you before you’re approved to lead on your own.

Once you’re a representative, how do you find presenter work? Here’s one possibility: A program manager at a fitness facility contacts a company’s events director (or a person in a similar position) to inquire about hosting requirements, types of certifications and workshops offered, and prospective dates. The company assigns an available presenter; someone who is geographically close to the host site may be chosen in order to reduce travel costs. The company and the host site are primarily responsible for marketing the event.

Other companies require the presenter to find the host sites, set up the dates, market the event and, sometimes, handle the registrations. The size of your network, your relationships with other fitness professionals and the number of other presenters who live in the same region and teach the same content will affect your success in this scenario.

Compensation and travel costs also vary. Some presenters earn a flat fee per event, and others are paid based on enrollment. A company may use a sliding pay scale to encourage presenters to work more hours and get more attendees. Some companies pay all travel costs, while others give the presenter a lump sum that includes travel costs.

Depending on the organization, there may be additional benefits for the presenters. “Presenters are offered resources to grow professionally, such as online development or in-person events,” says Scott. Some companies arrange for presenters to network regularly with each other to create a “family” atmosphere, and others may offer free continuing education credits or waive certification renewal fees.

Stay Local
If you’ve decided that the above options are not for you, but you still have a desire to speak publicly or educate, think about local opportunities. A hometown news station may need a fitness expert, or you can approach your fitness facility’s program manager about having you develop in-house workshops for the staff. More possibilities: Start a YouTube channel, ask to be a speaker at a civic organization, or write an article for an industry publication.

Fitness is always changing, and the industry needs passionate, knowledgeable professionals to share the information. There is definitely a place for you!

SARAH SCHRENK, MS, was a presenter for a national certification company for 8 years. She has also presented her own content at collegiate fitness conferences and written for American Fitness and IDEA Health & Fitness Association’s Fitness Journal.

Workshop Checklist

Original content:
- Develop unique content.
- Provide continuing education credits.
- Develop ongoing content.
- Market each event.
- Set your fee structure.
- Develop in-person or online education.

Product or brand representation (content already developed):
- Have experience with the product or program.
- Attend unpaid trainings.
- Define who markets the event (you or the company).
- Agree on compensation and travel costs.
- Ask about professional development for presenters.
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When I first became a personal trainer some 14 years ago, I was obsessed with corrective exercise and movement perfection. Prospective clients watched as I geeked out on every nuance of the impeccable squat. Once they became clients, they’d undergo extreme scrutiny while performing a squat as I lectured them—oblivious to their glazed-over eyes—on the dangers of knee valgus and ankle pronation.

When was the last time you tuned into what your clients really want?

Despite my enthusiasm, I struggled to convert prospects into clients. Many who did hire me would disappear into the ether, often long before their package was finished. While my desire to help others move well was commendable, my early experience taught me two valuable lessons about coaching, program design and client retention:

1. I had failed to adequately relay to clients my why for the program and how my choices would help them reach their goals.

2. I had failed to create programs that balanced the client’s interests with what I thought was best for them.

In the end, my failure to focus on the why of training cost me clients and sales. Had I paid better attention to my clients’ expressions and body cues, I might have clued into the fact that they weren’t getting from the sessions what I wanted them to get.

Programs That Cost You Clients

There are many reasons program choices drive clients away. Perhaps your sessions or classes are too complicated, too boring (as mine were) or too generic. Maybe your clients can’t stand jumping jacks, mountain climbers or burpees and would rather fire you or take a different class than do another rep.

Albuquerque, New Mexico–based Chris Frankel, PhD(c), head of human performance for Fitness Anywhere, recalls a time when he put a client through a workout that was too intense. “I remember one person who was so sore the following 3 days after the workout that [this person was] tapped out,” he says. “That was all on me.”

Jack Wheeler, founder and CEO of 360 Fitness in Red Deer, Alberta, says that a
specific session probably hasn’t caused a client to quit, but that information overload could have led to some attrition over the long term. “Maybe the client should have stuck to the basic movements or was overwhelmed with apps and homework,” Wheeler says. “In the end, they probably should’ve just eaten more veggies and worked out more.”

Both Wheeler and Frankel say that these mistakes could have been avoided by focusing more on what the clients wanted to achieve—and how to help them succeed. Essentially, programming is about making sure that every choice has a clear and direct reason behind it and that your clients understand those reasons.

“Programming is a critical part of every fitness professional’s business,” Frankel says. “It is where science, craft and brand intersect to help create the member/client/athlete experience. People are coming to you with their most prized possessions: mind and body. If you’re not practicing your craft with a why in mind, it’s probably time to look for a new career.”

Wheeler adds: “Just like all things in business where your projects and tasks need to align with your mission or you just

“People are coming to you with their most prized possessions: mind and body. If you’re not practicing your craft with a why in mind, it’s probably time to look for a new career.” —Chris Frankel, PhD(c)

Client Retention and Custom Programming: Dos and Don’ts

If you want to convert and retain clients and help them reach their goals, be clear about why you designed the program in the manner you did. While you may have advanced knowledge of the body, your clients most likely do not. Carefully consider whether your objectives match your good intentions, and ensure that your clients’ needs are being met.

• Do ask clients how their workouts are affecting their bodies and lives.
• Don’t presume that the latest and greatest move you just learned at a conference is right for your clients.
• Do monitor clients’ body language for signs of disinterest.
• Don’t try to impress new clients with your expertise by pushing them too hard.
• Do encourage honest feedback and take it to heart.
• Don’t apply a standard template to all your clients. Train the person in front of you.

with my approach or I am not experienced enough to use them properly. The best advice I can give to a fitness pro is to have a training philosophy that you constantly refine and to filter new ideas and topics through that lens.”

On the other side of the coin, Wheeler suggests selecting educational events with your clients in mind. “Many coaches perceive more value in learning the 99th way to do a squat than they do in solving real-life problems for [a] client,” he says. “Pros need to figure out what their clients actually need and get better at that, [rather] than just padding the stats on their business cards.”

GET CLEAR ON YOUR CLIENT’S WHY

Rose Calucchia, NASM-certified personal trainer and business coach in Santa Cruz, California, creates programs after doing a deep dive on the client’s motivation.

“The reason someone wants to hire a trainer can sometimes be tricky to figure out,” she says. “It might sound obvious when someone says, ‘I want to lose some weight.’ But if you ask why they want to lose weight, you’ll probably get more insight into what the person is really looking for.”

Once you uncover the underlying driver for weight loss, you can refine your approach to help clients get to where they want to be. “It’s important to find out what the motivator is, because that will inform how you program for that person and also how to make recommendations for other lifestyle changes,” Calucchia says.
READ THE CUES

So, how do you tell if your sessions are turning people off? Watch for signs, say experts.

Frankel says common indicators that clients are displeased include showing up late and/or leaving early, appearing unmotivated, not interacting with you or others in the group, or asking questions about why they aren’t seeing results.

“Pay attention to them during breaks,” adds Wright. “What’s their body language? What’s the tone? Think of being a coach on a timeout in a game or match. You have to look at your team and the other team to see who’s ready for the next quarter and who’s ready for their after-match shower.”

ASK QUESTIONS

When all is said and done, the best way to understand if your programs hit or miss the mark is to ask.

“We always overthink things and think we know what’s best for our clients all the time,” Wheeler says. “In reality, we didn’t ask them what they need help with in the first place.”

Wright agrees and adds, “Too often we try to ‘figure them out’ when we can simply ask for their feedback. No, you can’t please everyone, but you can take their feedback to enhance the experience you provide.”

Wheeler has found that one of the most successful tools for understanding client wants and needs is a survey that includes questions about their experiences at the gym, what they tell others about those experiences, their goals and more. He also asks respondents about their hobbies, physical activity outside of sessions and shopping habits. In these surveys, respondents have the option to either remain anonymous or submit a name and receive a participation reward.

PROS NEED TO FIGURE OUT WHAT THEIR CLIENTS ACTUALLY NEED AND GET BETTER AT THAT, [RATHER] THAN JUST PADDING THE STATS ON THEIR BUSINESS CARDS.”

—Jack Wheeler

IMPROVE YOUR COMMUNICATION

Every coach has his or her unique way of communicating with others. However, in the same way that you choose specific exercises to meet the unique needs of each individual client, so, too, should you individualize the words you use, says Calucchia.

You may be capable of going on and on about anatomy and structural function, but if telling your client to engage his lats elicits a blank stare, you could be negatively affecting his experience. “One of the mistakes I see trainers make when it comes to programming is overcomplicating things and not explaining their programming in terms the client can understand,” she says. “Most of us love to geek out on the newest techniques and use terms that are over most gym-goers’ heads. Not only can this be super-intimidating for clients, but it can also be a turnoff to working with you.”

When all is said and done, each movement, sequence and tempo in your program should have a purpose or you run the risk of decreasing your clients’ or participants’ success potential, reducing retention and weakening your bottom line.

Calucchia summarizes the best advice she was given on this topic: “A previous boss of mine said, ‘If you can’t sell a client, why you’ve chosen each and every exercise in their program, then chances are slim they’ll see you for more than a complimentary session.’ After that insight, I was able to sell a lot of personal training quite quickly and retain clients long-term simply by explaining the why behind each exercise and how it related back to the client’s goals.”

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A Winning Philosophy

Successful personal trainers routinely ask themselves the following question: If my entire future were based on the way this one client evaluated her experience with me right now, would I change anything? They might also ask, Did I exceed this client’s expectations? If the answer to either of these questions is “no,” a committed fitness professional will continue to look for ways to improve. NASM’s program, application, integrity, solutions and tools are the foundation for creating “yes” answers to these questions and providing optimal performance and results for clients.

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BY LAURA QUAGLIO, WITH ANDREA LEONARD & ANNA L. SCHWARTZ, PHD

WORKING THROUGH CANCER:
EXERCISE AS A PART OF RECOVERY

An introduction and overview for fitness professionals interested in helping restore quality of life to people in cancer treatment and beyond, with a special focus on breast cancer.

Cancer is serious business. It is second only to heart disease as Americans’ leading cause of death, and more than 1.7 million new cases of cancer are expected to be diagnosed this year. Of those new cases, many will be invasive breast cancer (an estimated 268,600 in women and 2,670 in men), with nearly another 63,000 “in situ” (early stage) breast cancers in women (ACS 2019). As we near the year 2030, when all of the baby boomers will be 65 or older, the number of people facing cancer is likely to increase, too, since both chronological age and biological age are strong predictors of this disease (USCB 2018; Kresovich et al. 2019).

While these statistics are sobering, there are more-encouraging numbers, too: Nearly half of these new cancers (about 42%) can be prevented through healthy lifestyle changes. In fact, about 18% of them are caused by a combination of excess body weight, physical inactivity, poor nutrition and excess intake of alcohol (ACS 2019). So, the work that fitness professionals are doing today may be helping to prevent clients from developing cancer in the first place.

For those who do receive a cancer diagnosis, exercise trainers and instructors can also make a difference—by encouraging them to engage in regular exercise and healthier eating before, during and after treatment. These healthy habits have
been proven to minimize the debilitating side effects—acute and chronic—of the condition itself, as well as those caused by medications, treatment and surgeries.

In addition, regular exercise can improve the efficacy of cancer treatments and, with proper programming and progression, can result in clients/patients becoming stronger than they were prior to their diagnosis. Exercise has even been found to reduce the likelihood of recurrence (ACS 2015; Ashcraft et al. 2019). (See “Benefits of Exercise for People With Cancer,” below, for more.)

SHOULD CANCER BE PART OF YOUR BUSINESS?
With about 15.5 million Americans—about 5% of today’s population—living with cancer, it is likely that most fitness professionals will encounter clients whose abilities, goals and fitness programming will be affected by this disease (ACS 2019; ACS 2014; USCB 2019). For trainers who would like to work with such clients, it is vital to understand the unique concerns of this population, says Andrea Leonard, whose diagnosis of thyroid cancer at the age of 18 inspired her to become an NASM-CPT, CES, PES. Since then, she has earned worldwide recognition for her expertise on cancer and exercise; co-written one of the first books on this topic, Essential Exercises for Breast Cancer Survivors: How to Live Stronger and Feel Better (The Harvard Common Press 2000); founded The Cancer Exercise Training Institute (CETI); and developed the Cancer Exercise Specialist® Advanced Qualification and other courses for fit pros (thecancerspecialist.com).

“This is a much higher-risk group than the average person,” says Leonard. “You need to have a complete understanding of all acute and chronic side effects—including those related to any kind of surgery/treatment clients have had (or are currently undergoing)—and [you must know] how to create a program that will prevent, minimize and correct any of those elements.”

Anna Schwartz, PhD, FNP, FAAN, agrees. This world-renowned researcher and author of Cancer Fitness: Exercise Programs for Patients and Survivors (Fireside Press-Simon & Schuster 2004) and Exercise for Breast Cancer (DSW Fitness 2017) also knows firsthand the challenges and rewards of exercising during and after cancer treatment: She was diagnosed with lymphoma during her last year of nursing school, in 1986, and found relief from fatigue by training as a cyclist. It was this—and her observations in the bone marrow transplant unit where she worked—that inspired her to pursue advanced degrees studying the link between exercise and cancer recovery.

“At the time, only one study had been conducted on that, and exercise professionals were not sure that exercise was such a good thing for cancer patients,” she says. “Today, compelling research from literally thousands of studies has demonstrated the beneficial effects of exercise for cancer survivors—reduced fatigue, improved quality of life and improved functional ability (muscle strength and aerobic function).”

Like Leonard, Schwartz thinks that it is essential for exercise professionals who want to work with this population to pursue a solid education in the finer points of cancer, its treatment and its effects on the body, both short- and long-term. “I look at it like a mathematical equation,” says Leonard. “A is surgery, B is treatment, C is side effects, D is lymphedema—add in assessments and personal goals and, only then, can you put together a safe exercise program.” These elements are covered in brief here, but Leonard adds, “What people need to walk away with [after taking this CEU course] is the knowledge that it’s not enough.”

That said, these experts offer preliminary information to provide a glimpse into this world so fitness professionals can decide whether this is where their passion lies. The remainder of this article will focus more

Benefits of Exercise for People With Cancer

These are some of the perks for people in cancer treatment who participate regularly in an appropriate exercise program:

• improved quality of life
• improved functional ability (everyday tasks)
• improved balance (for fall prevention)
• improved weight management
• improved body image and self-esteem
• reduced fatigue, stress, anxiety and depression
• reduced risk of sarcopenia (muscle wasting)
• reduced risk of osteoporosis (bone weakening)
• reduced risk of cardiovascular disease and diabetes
• improved blood flow and reduced risk of blood clots
• improved flow/drainage in lymphatic system
• improved efficacy of certain cancer treatments

Sources: ACS 2014; Schwartz 2017; ACS 2015; Schmitz 2019.
narrowly on the side effects, treatments and considerations for people with breast cancer, which is currently the most prevalent type in the United States (NCI 2019).

BREAST CANCER TREATMENT AND SIDE EFFECTS

The most common forms of treatment for breast cancer are surgery, chemotherapy and radiation therapy. Surgery is used to remove cancerous tissue. The procedure can involve a lumpectomy (removal of a small confined tumor) or a mastectomy (removal of part or all of the breast tissue and probably some nearby lymph nodes). Chemotherapy and radiation therapy are used to kill or slow the growth of cancer cells with medication (IV or oral) or high-energy radiation (as from X-rays), respectively. Radiation therapy is often used after surgery to kill any remaining cancer cells, though it can also be used to control cancer that has metastasized (spread from the initial site).

Other types of medication may also be used to hamper the growth or spread of cancer, such as those that prevent or limit the production or circulation of estrogen and those designed to help the immune system fight cancer cells (ACS 2016; Schwartz 2017). Cryosurgery, hyperthermia, stem cell transplant, transfusion, ultrasound, and use of radio frequency or electrical current (to disrupt tumor cells) are just a few of the other treatments being used to treat a variety of cancers (CETI 2019). Each of these treatments can result in side effects, which may be different from person to person. Here are some examples worth noting:

MEDICATION, CHEMOTHERAPY AND RADIATION THERAPY SIDE EFFECTS

Medications, including chemotherapy, can cause or worsen digestive problems (constipation or nausea), mouth sores, osteoporosis (bone loss), peripheral neuropathy (loss of sensation in the hands and feet), sarcopenia (muscle loss/wasting), sleep problems and weight gain (plus its associated risks, such as heart disease and diabetes).

“You really have to look up each treatment/medication,” says Leonard. “Each has different side effects, from cataracts to cervical cancer to second cancers. It’s so vast.”

Radiation therapy can cause its own set of problems. “Fatigue and skin breakdown are the primary side effects of radiation therapy that impact exercise,” says Schwartz. “Fatigue is actually reduced with a well-crafted exercise program, but skin breakdown may limit exercise because one does not want to perspire in the area that is being treated. This would cause pain and increase risks for infection.” Radiation can also cause lymphedema—swelling of the treated area from damage to the lymphatic vessels and nodes. (Learn more on page 24.)

Both radiation and chemotherapy can lower the body’s immune response, putting people at risk for infection and contagious illnesses (Schwartz 2017).

SURGERY SIDE EFFECTS

Surgery can cause many types of muscular dysfunctions and compensations, some of which are not modifiable with exercise. For example, surgical damage to the long thoracic nerve can cause the serratus

NEARLY HALF OF NEW CANCERS (ABOUT 42%) CAN BE PREVENTED THROUGH HEALTHY LIFESTYLE CHANGES. IN FACT, ABOUT 18% OF THEM ARE CAUSED BY A COMBINATION OF EXCESS BODY WEIGHT, PHYSICAL INACTIVITY, POOR NUTRITION AND EXCESS INTAKE OF ALCOHOL.
anterior (integral to pushups and proper posture) to temporarily cease firing; this can result in a permanently retracted or winged scapula, impinging shoulder flexion movement. Scar tissue from surgery (and radiation) can lead to a “frozen” shoulder. With breast cancer, range-of-motion limitations primarily restrict the nearby shoulder, though the entire body can be affected because of the kinetic chain and the interrelation of all of the body’s systems to one another.

LYMPHEDEMA
For those whose surgery involves removal of lymph nodes in the armpit area or those who have undergone external-beam radiation therapy, there is a lifelong risk for lymphedema. Lymphedema is a serious condition marked by swelling in the pec/lat area, arm, or hand and/or fingers on the affected side of the body. If not treated properly, lymphedema can result in limited movement, pain and increased risk for infection (Schwartz 2017).

Without treatment and the proper use of a compression sleeve, lymphedema can also progress to more advanced stages, notes Leonard. “If a person with this risk does too much exercise (cardio, resistance training, even holding a yoga pose for too long) and/or progresses too quickly—not knowing what the lymphatic system can handle—lymphedema can happen,” she says. “It can completely be avoided, but often the doctors don’t even talk about it, so the client may not know about this risk.”

Note: Maintaining healthy levels of body fat can help prevent lymphedema, as can specific types of exercise. In addition to doing low- to moderate-intensity cardiovascular exercise to improve weight and body composition, there are specific moves that can encourage lymph drainage from the upper body. These include pelvic tilts, modified situps and neck stretches, as well as shoulder exercises such as shrugs, rolls, circles and isometric shoulder blade squeezes (CETI 2019). Other movements are contraindicated: For example, trainers must never apply direct pressure to—or allow the client to place an elastic band on/around—the affected area. (This applies to foam rollers, too.) All of this detail serves to highlight the scope of information necessary for fitness professionals to create a well-constructed program for the cancer survivor.

BREAST RECONSTRUCTION SIDE EFFECTS
Another type of surgery—breast reconstruction—is also likely to affect exercise. For example, sometimes “flaps” of tissue (muscle, blood vessels, fat and skin) are moved to the breast area from other parts of the body. These include the lower stomach (TRAM flap), back (lat flap) or buttocks (gluteal flap) (Schwartz 2017). The “shifted” muscles, if they are still attached at their original point of origin, will continue to behave as they always did, which can seriously disrupt specific exercise movements, Leonard explains. For example, when the latissimus dorsi is used in breast reconstruction, it will still fire in response to lat exercises, even though the tissue flap is now on the anterior (front) of the body. Another effect of this surgery can be limited shoulder ROM. Further, clients who have undergone an abdominal TRAM cannot (and should not) perform any type of crunch exercise; instead, they should work on shoulder
stabilization (but avoid exercises like the lat pulldown). Also, when skin expanders are in place, clients cannot perform any exercises involving the pectoral muscles. That includes back exercises, because the eccentric movement will stretch the chest muscles (Schwartz 2017).

ASSESSING A CLIENT WITH BREAST CANCER

As is evident from these examples, working with a client who is undergoing or recovering from breast cancer treatment presents a myriad of challenges not often seen in the general population. Furthermore, no two cancer patients are alike; even if they have similar demographics, physical characteristics, treatment programs and so on, their individual responses to treatment may be completely different. In fact, the uniqueness of each client is the reason the NASM personal training certification is emphatic in stating that every client relationship should begin with an intake interview and assessments, including, of course, when the client has (or has had) cancer.

According to NASM Essentials of Personal Fitness Training (Jones & Bartlett Learning 2018), people with cancer can be assessed with many of the methods recommended for general-population clients. However, when cancer is involved, the client’s ability level and current symptoms and side effects should be taken into consideration beforehand (NASM 2018). For example, if the person has peripheral neuropathy in the feet, it may not be safe to do a single-leg balance assessment, since this condition increases the risk of falling.

The following assessments and evaluations from the NASM-CPT textbook should be performed prior to working with a cancer survivor or current patient, with a few caveats noted below:

- Physical Activity Readiness Questionnaire (PAR-Q)
- medical history (This includes cancer surgeries, medications and side effects, as well as other past injuries, surgeries, comorbidities and medications.)
- body composition (Don’t use a caliper on the affected area.)
- static postural assessment
- overhead squat assessment
- pulling assessment (standing cable row) (Don’t use if skin expanders are in place.)
- 6- or 12-minute walk/run test
- maximum heart rate should not be used, either in initial assessments or in gauging the client’s exercise intensity or tolerance for workouts happening during active chemotherapy treatment. Often, anemia caused by chemotherapy can lead to inaccurate estimates (Schwartz 2017). (See “Intensity,” page 27, for more appropriate methods.)

OBTAINING A MEDICAL RELEASE

“In an ideal world, medical providers would work collaboratively with fitness professionals to optimize the cancer survivor’s health,” says Schwartz. But fitness professionals should know that the vast majority of cancer survivors can exercise without a medical provider’s “release to exercise.”

LYMPHEDEMA IS A SERIOUS CONDITION MARKED BY SWELLING IN THE PEC/LAT AREA, ARM, OR HAND AND/OR FINGERS ON THE AFFECTED SIDE OF THE BODY. IF NOT TREATED PROPERLY, IT CAN RESULT IN LIMITED MOVEMENT, PAIN AND INCREASED RISK FOR INFECTION.
Cancer survivors with multiple comorbid conditions, however, should consult their medical provider before beginning an exercise program (Schwartz 2017).

Knowing when to obtain a release, says Leonard, is another example of the importance of being appropriately trained—for the sake of both liability and sensitivity. “Without suitable training, you could hurt somebody who is already suffering,” she says. “These people’s lives have been turned upside down physically, emotionally, financially. I’ve turned down cardiac patients because I do not consider myself an expert in that. You have to know your limitations as a trainer.”

**BASIC PROGRAM GUIDELINES**

When designing exercise programs for breast cancer survivors, fitness professionals must maintain a degree of adaptability, as clients’ needs and abilities will likely vary from session to session or even minute to minute. Needs will also be different for those in treatment versus those who are in early recovery from treatment or have been cancer-free (or disease-stable) for a long period of time. That said, here are some generalities that demonstrate how programming for people with cancer may differ from what is appropriate for the general population.

**GOAL SETTING**

A recent study demonstrated that exercise outcome expectations are often important to providing them with enough guidance to prevent them from overtraining and causing further injury or lymphedema. “We want two things from an exercise session,” says Leonard. “One, for the person to leave excited to come back, and, two, we want them to feel better than when they walked in the door.”

**MODE**

Research shows that aerobic exercise affords more benefits to cancer survivors than resistance training and other modalities; however, because of the increased risk of osteoporosis for many of these clients, strength training (specifically bone-building exercises) should also be encouraged (Schwartz 2017). Here, a few additional observations:

**CARDIORESPIRATORY EXERCISE.** Schwartz recommends beginning with walking, “as it is key to remaining functionally independent, doesn’t require supervision and has few barriers” (Schwartz 2017). Other good aerobic training options include stationary cycling, indoor rowing, low-impact or step aerobics, circuit-style group classes, and balance- or core-training classes (NASM 2018; NASM 2014).

**RESISTANCE TRAINING.** It is important to begin strength training with body weight—and isometrics, when appropriate—and progress the client through the NASM Optimum Performance Training™ model, beginning with Stabilization Endurance. Clients should not go beyond Phases 1 and 2 unless cleared to do so by a physician (NASM 2018). Also consider the types of moves and equipment used: Fatigue, weakness, and peripheral neuropathy can make it dangerous for clients to work with free weights such as dumbbells or even with exercise bands (which they might let go of inadvertently). Even some body-weight exercises are not recommended; for example, pushups are contraindicated because of the pressure they put on the affected limb (and the likelihood that the client already has upper crossed syndrome).

**STRETCHING AND FOAM ROLLING (OR SMR).** Flexibility moves, including static and active stretching, may be beneficial, as long as you keep in mind any physical limitations (NASM 2018). Self-myofascial release should be avoided if a participant is undergoing chemotherapy or radiation therapy or is at risk for lymphedema. Also, foam rolling should never be done near a healing surgical wound, an area of lymph...
node removal or irradiation, or any painful or swollen body part.

**OTHER MODALITY CONSIDERATIONS.** Each type of exercise must be carefully evaluated to ensure that it does not pose an additional risk to the client. The risk may not always be obvious or evident without careful consideration or further instruction. Swimming, for instance, can be a great choice for breast cancer survivors with lymphedema, but only if the workout takes place in a private, chlorinated pool—and the person does not have skin damage from radiation therapy. Swimming in a public pool, river, lake or ocean is not recommended for anyone who has a compromised immune system.

**FREQUENCY**
Cardiorespiratory training is advised 3–5 days per week. Resistance training is recommended 2–3 times per week (1–3 sets of 10–15 reps or to fatigue), with 2 rest/recovery days between bouts (Schwartz 2017; NASM 2018).

**INTENSITY**
Fatigue is one of the most prevalent side effects of breast cancer and its treatments. It is vital to strike a balance by helping clients “push” themselves to exercise without letting them push so hard as to worsen fatigue. Fitness pros should also discuss hydration and sleep hygiene, as problems with these can worsen fatigue (Schwartz 2017).

Generally, moderate intensity is recommended for people in cancer treatment or early recovery. As mentioned earlier, peak maximal heart rate is a poor indicator for those undergoing chemotherapy. Instead, the Karvonen method, based on heart rate reserve, should be used to calculate MHR because this formula takes into account resting heart rate, which is often elevated during cancer treatment.

Rating of perceived exertion, or the Borg Scale, may also be used (Stefani, Galanti & Klika 2017). RPE is particularly helpful for breast cancer patients, whose fatigue and pain levels may vary (Schwartz 2017). An even simpler (yet effective) choice is the talk test; the client should be able to carry on a conversation during moderate exercise. Details on these methods can be found in NASM 2018.

**DURATION**
Assessments—both at the initial intake and in weekly sessions—should guide the duration of activity. Some clients may need to begin with a few minutes of low-intensity cardio training (such as slow walking) and gradually progress to 20- or 30-minute sessions over the course of several weeks. For those struggling with fatigue, the recommended 30 minutes of cardio can be divided into two or three 10-minute sessions (or five or six 5-minute sessions), done at times of the day when energy levels are highest.

Group exercise instructors should be sure to tell participants with cancer to take rest intervals as needed and not try to “keep up” with the class; they should also know it is fine to leave at any point and, in fact, they should absolutely stop in certain circumstances (see “Signs It’s Time to Stop,” page 25).

**PROGRESSION**
Clients should be progressed slowly—using the NASM OPT™ model—from stabilization to strength. They should not perform plyometric training until they can complete three Phase 1 workouts per week (NASM 2018); some clients may remain in corrective exercise for many weeks, if not permanently.

As clients become able to do more, fit pros can progress them first by lengthening or adding exercise sessions, then by gradually increasing the intensity or difficulty (NASM OPT phase). More extensive certification courses, such as those from CETI, offer detailed guidelines on the return-to-exercise timing and progressions for a number of specific cancers.

**LOCATION AND EQUIPMENT**
For clients with a compromised immune system, it can be dangerous to participate in group exercise or work out at a gym, where bacteria and viruses can abound. Helpful precautions for clients include wearing exercise gloves, using their own water bottle (not a fountain), wiping down machines and equipment before use as well as after, and scheduling training dur-
regular exercise can also improve the efficacy of cancer treatments and, with proper programming and progression, can result in clients/patients becoming stronger than they were prior to their diagnosis. exercise has also been proven to reduce the likelihood of recurrence.

frame of mind and motivation

Last but not least, breast cancer treatment and side effects have a significant impact on the mind as well as the body. “Breast cancer is one of the most outward cancers,” says Leonard. “It affects the woman’s self-esteem, her control of her body, her sense of womanhood.” Leonard advises giving sincere praise and helping clients focus on how far they have come by comparing progress to initial assessments.

Some people will want to talk about their cancer and treatment; others will not. Elite athletes and fit pros may need extra encouragement, as they are more likely to backslide in strength than less-fit patients who are just beginning to work out and may actually see progress almost right away.

“You may need to be part friend, part cheerleader, part exercise physiologist,” says Leonard. “And you have to keep negativity from rubbing off on you. It’s not always fun, but it is incredibly rewarding.”

the rewards of working with clients who have cancer

“Cancer strips you of everything,” says Leonard. “We have the power to give these clients some kind of control at a time when their body has completely failed them. I can’t think of a situation where I couldn’t help someone with cancer.”

As anecdotal evidence of the possibilities, Schwartz shares her own success story: After her diagnosis and during treatment, she experienced weight gain, depression and exhaustion. “Just walking up a flight of stairs took effort,” she says. “I started cycling and slowly built my endurance up enough to ride with a group that was training in town. Little did I know that many of these cyclists were Olympic team members and professional racers.” Schwartz began racing—then winning. She went on to set several world records and won a national tandem time-trial championship.

The beauty of learning more about working with this population is that many of the lessons can be applied to many modalities and many different people with many types of conditions. “Once you understand how to program for people with cancer, you can adapt [that knowledge] to any modality: TRX®, Pilates, anything,” says Leonard. “But you have to understand the theory, how to identify when something is not going right and how to keep the client safe.”

editor’s note: You can request a free copy of “Essentials of Cancer Exercise” and learn more about the Cancer Exercise Specialist Advanced Qualification, Breast Cancer Recovery BOSU® Specialist” Advanced Qualification and Cancer Exercise Pilates Specialist” Advanced Qualification by visiting thecancerspecialist.com.

Laura Quaglio has written for numerous health and wellness magazines, books, and websites, and she’s been a regular columnist and contributing editor for NASM since 2013. Recently, she wrote the CEU article “Fitness for Two” for exercise professionals interested in working with pregnant women (Fall 2017). That course is available on afaa.com/courses#ceu-corner.

Andrea Leonard, NASM-CPT, CES, PES, is a 35-year cancer survivor and the PFP/Club Industry 2019 Personal Trainer of the Year. She founded the Cancer Exercise Training Institute. Learn more at thecancerspecialist.com.

Anna L. Schwartz, PhD, FNP, FAAN, is a 33-year cancer survivor and the author of six books and hundreds of scholarly articles on cancer and physical activity. Learn more at annaschwartzphd.com.

References for this article available online at magazine.nasm.org.

regular exercise can also improve the efficacy of cancer treatments and, with proper programming and progression, can result in clients/patients becoming stronger than they were prior to their diagnosis. exercise has also been proven to reduce the likelihood of recurrence.

Ing “slow” times at the gym—or shifting workouts to the home. Fitness professionals who are not feeling well or suspect they may be getting sick should never train a person with cancer.

Finally, for this population (and anyone with balance concerns, peripheral neuropathy, and/or increased risk of bleeding or bruising), the workout area must be kept clear of obstacles to prevent inadvertent collisions or other injuries (such as bumping into another exerciser, dropping free weights or getting blisters from improper footwear). Also, fitness pros should check equipment for any burrs or imperfections that could cause cuts or other skin damage.
CEU QUIZ: Working Through Cancer: Exercise as a Part of Recovery

LEARNING OUTCOMES: After reading the article, you should be able to:
1. Describe the prevalence of cancer, and particularly breast cancer, in the United States.
2. Identify the basic benefits of exercise for a person who has cancer or is a survivor.
3. Explain common side effects of breast cancer treatment and how they can affect exercise.
4. List the assessments appropriate for people who are undergoing breast cancer treatment.
5. Discuss exercise modifications and cautions unique to people with breast cancer.

1. About _____ of cancers in the United States are caused by excess body weight, physical inactivity, poor nutrition and excess alcohol intake.
   a. 5%
   b. 18%
   c. 42%
   d. 75%

2. To understand the potential side effects from a client's cancer medication, fitness professionals should
   a. have a basic understanding of general side effects
   b. ask clients what they think the side effects are
   c. ask clients what exact medications they take and research the side effects
   d. not worry about side effects until they occur during a workout

3. For clients in radiation therapy, an exercise program can __________ the side effect of fatigue and __________ the side effect of skin irritation.
   a. increase, reduce
   b. reduce, aggravate
   c. nearly eliminate, reduce
   d. reduce, nearly eliminate

4. Lymphedema, which can happen to people who have had lymph nodes removed, is __________.
   a. a manageable side effect of all cancer treatments
   b. an unavoidable side effect of all cancer treatments
   c. a temporary side effect of certain cancer treatments
   d. a lifelong risk of certain cancer treatments

5. Which of these assessments are generally recommended for people in breast cancer treatment?
   a. goniometry and caliper measurements on all areas of the body
   b. the overhead squat assessment and the pulling assessment (standing cable row)
   c. the overhead squat assessment and the 6- or 12-minute walk/run test
   d. the single-leg balance assessment and resting heart rate (using radial pulse)

6. A person who has undergone an abdominal TRAM procedure should __________.
   a. avoid situps, pushups and crunch-type exercises
   b. perform situps and pushups 2–3 times per week
   c. perform situps or crunch-type exercises but not pushups
   d. perform pushups but not situps or crunch-type exercises

7. Which of these modalities affords the greatest benefits to the cancer survivor?
   a. resistance training
   b. cardiorespiratory exercise
   c. flexibility training
   d. All are equally beneficial.

8. Swimming is contraindicated for people with cancer __________.
   a. if the location would be a lake, river or chlorinated public pool
   b. if the client’s immune system is compromised by chemotherapy or lymphedema
   c. if the client has skin damage or irritation from radiation therapy
   d. all of the above

9. What are the general recommendations for resistance training guidelines for people with cancer?
   a. 1–3 sets of 12–20 reps 2–4 times per week (the same as for the general population)
   b. 1–3 sets of 10–15 reps 2–3 times per week
   c. 3–5 sets of 8–10 reps 3–5 times per week
   d. 1 set of 8–10 reps 3–5 times per week

10. To gauge the exercise intensity for a person undergoing chemotherapy, __________ is not an appropriate method.
    a. heart rate reserve (Karvonen)
    b. peak maximal heart rate
    c. rating of perceived exertion (Borg Scale)
    d. the talk test

11. Under what circumstances is it okay for a fitness professional with a head cold to conduct a training session with a person who has cancer?
    a. if the fit pro is feeling well enough to work out him/herself
    b. if the fit pro avoids physical contact and wipes down all gym equipment
    c. if the fit pro and client are in a private facility or the person’s home
    d. Training a client with cancer is never okay if the fitness professional is feeling unwell.

12. A fitness professional should stop training a person with breast cancer if __________.
    a. her friends and family tell her that exercise is a bad idea
    b. she is otherwise healthy but has not gotten a medical release form
    c. she is fatigued and asks to stop
    d. she exercised little or not at all before her diagnosis/treatment

13. In the first weeks of a workout program begun during cancer treatment, strength is likely to __________ for an elite athlete and __________ for a beginner or recreational exerciser.
    a. backslide, backslide
    b. increase, increase
    c. rollback, increase
    d. increase, increase

14. Breast cancer medication, treatment and surgery are likely to restrict motion _______.
    a. only in the shoulder of the affected side
    b. only in the shoulder and arm of the affected side
    c. only in the shoulder, back muscles and arm of the affected side
    d. throughout the body as a whole, because of the kinetic chain

15. To be prepared to safely train people who have or have had cancer, it is sufficient for an exercise professional __________.
    a. to have completed and passed the NASM-CPT course and this CEU quiz
    b. to seek additional training through a detailed, comprehensive course designed by cancer experts
    c. to have had a cancer diagnosis and learned how to exercise during and after their own treatment
    d. to have earned the NASM-CPT and Corrective Exercise Specialization

To earn 2 AFAA/0.2 NASM CEUs, purchase the CEU quiz ($35) and successfully complete it online at afaa.com.
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Master fitness trainer and coach to everyone from young, aspiring athletes to all-star pros, Michael Piercy, MS, believes in being a lifelong learner, playing to your strengths and giving your all for what you believe in.

BY SHIRLEY ARCHER, JD, MA

What do you do when life throws you a curveball? Let’s say your program design doesn’t fit a client’s current mood or your class has participants with wide-ranging ability levels. If you’re Michael Piercy, MS, NASM-CPT, CES, PES, MMACS, SFS, WFS, WLS, you don’t bat an eye. “Mike Piercy is a playmaker in sport and in life. He inspires and leads the team, making points, setting up others while staying humble and having fun in the process,” says Steve Katai, director of education for Hedstrom® Fitness in Ashland, Ohio. “I witnessed Piercy in action during a recent fitness conference when an indoor session was oversold. He called an audible and ran the large group outside for the warmup—not the original play. He reconfigured the session on the fly into a circuit, so he could use other areas of the building. What he delivered wasn’t the original plan, but those in attendance would not have known otherwise. He tapped his experience instead of complaining or succumbing to chaos. He made a game-changing call that delivered a powerful training session. Playmaker!”
Owner of The LAB: Performance and Sports Science in Fairfield, New Jersey, Piercy (@michaelpiercy) inspires training clients, pro athletes and fitness professionals to be their best. Surrounded by a sports-loving family, Piercy proudly used his Hulkamania™ Workout Set at age 8 because he wasn’t allowed to touch his older brother’s weights.

In middle school, he set the school record for situps in the Presidential Physical Fitness Test. Then, at age 15, he earned his first fitness certification and began his fitness trainer career at Bally’s Total Fitness in Springfield, New Jersey. His mission and life’s work: Make fitness fun and coach people at all ability levels to unleash their inner athletes and achieve peak performance.

Value of the Big-Box Experience

What are the secrets to developing a lasting fitness career? and member services to sales and facility management. This wide-ranging experience gave him insight into all aspects of fitness business and allowed him to hone multiple skills. From his early start at age 15, Piercy continued working at clubs through high school and college.

“Nowadays, a lot of people get a certification and go straight into opening a business,” says Piercy. “I don’t recommend that. I recommend that every fitness professional start at a big-box club. You’re exposed to many different types of people, and you learn what you should and shouldn’t do. I always wanted to have my own business. At clubs, I learned how I wanted to treat people and how I didn’t want to treat people. No other [professional] training can compare with it.”

As Piercy was growing up, his mom fueled his passion for learning about fitness training. “She would not always buy me toys,” he recalls, “but she would let me get fitness books at frequent weekend trips to Jersey malls.” This passion for knowledge was furthered when Piercy worked at New York Sports Club, because the facility supported NASM as an education provider and allowed payroll deductions to be used for education expenses. In addition, the annual TSI Summit exposed him to presenters and innovative fitness education and conferences.

“The other great lesson I learned is that I have to be ready for any circumstance. People get cut. People get traded. Nothing is guaranteed to be the same as yesterday. You need to be able to make split-second adjustments to whatever happens, which you have no control over. I try to carry that attitude over into my work—for example, when I’m presenting.”

—Michael Piercy, MS
In college, Piercy continued his love of training and sports and played on the Kean University baseball team in Union, New Jersey, while earning a bachelor’s degree with honors. (It was during this time that Piercy was exposed to Under Armour, because it provided compression shirts for athletes.) From Kean University, the Pittsburgh Pirates drafted Piercy in 1999 in the 23rd round.

**Lessons Learned From the Dugout**

Piercy highlights the significance of his pro athletic career in light of the life lessons it provided—lessons that continue to inform and inspire his work as a trainer, coach and fitness educator. Piercy’s professional baseball career lasted 6 years (1999–2005) and spanned three different organizations: the Pittsburgh Pirates, the New York Mets and the Montreal Expos. He challenges the popular notion that simply being a professional athlete prepares you to be a good trainer. “Just because someone is a great athlete does not mean they can train others,” he says. “Being a great trainer and coach are different skills from being a great athlete.”

Piercy describes his professional athletic career as a fantastic training ground for life, however. “Being a pro athlete was the hardest job I ever had,” he says, noting that many people don’t realize how professional baseball is different from a lot of other sports. “The schedule is grueling with very little time off—you play every day. You’re not going to be 100% every day…there’s always some soreness or nagging injuries. You learn to give 100% of what you have on any given day.”

**“Mike trains me like an athlete. I’ve never been an athlete in my life. I am an athlete!”**

Bettyna Julien, 39 years old, owner and founder of L’O R Consulting Services, Montclair, New Jersey, says, “I have lost 70 pounds while training with Mike. I’ve reached my ultimate weight loss goals…all injury-free. Mike pays attention. He knows when I’m having an off day or a great day, and he works off that energy. He is tough. He knows what I can do and will not let me slack, but [he] will also not overdo it. He is fun—as hard as my workouts are, they’re always fun. I may walk away feeling as if I may never walk again, but I always walk away with a smile.”
“In addition, you need to be physically fit to perform the activities you need to do on a daily basis. You need to think about how to address mental and physical challenges. You learn that consistency is key. In an over-165-game season, you can’t get too down on yourself or too high when you’re up. You need to stay on an even keel and be consistent. It’s a great metaphor for life.

“The other great lesson I learned is that I have to be ready for any circumstance. People get cut. People get traded. Nothing is guaranteed to be the same as yesterday. You need to be able to make split-second adjustments to whatever happens, which you have no control over. I try to carry that attitude over into my work—for example, when I’m presenting.”

From a training perspective, Piercy fully appreciates the value of working with great coaches. “I’ve worked with many coaches throughout my life. [I’ve learned] something different from each. They say that when the student is ready, the teacher appears. I believe that.”

**Train Like a Coach: Build Relationships and Community**

Michael Piercy offers these tips on developing your fitness career:

**WORK WITH MENTORS.** “Mentors have made a huge difference in my career. Not only in guiding me, but in asking me the right questions.”

**BE AUTHENTIC.** “We all have strengths and weaknesses. Find ways to give to people by being authentically who you are.”

**FOLLOW YOUR PASSION.** “My time as a pro athlete is over, but I wanted to train youth athletes and help others become their best.” Piercy teaches youth athletes at his studio and volunteers. He offers a “Fitness as a Second Language” school program to inner-city youth and received a 2016 mayoral award for community influence.

**HAVE FUN.** “Fitness is too important to be boring. I want people to have fun. Sure, there are important things to pay attention to and to learn, but nowhere does it say we can’t have fun doing it. You break down walls by creating laughter and joy.”
says, “Mike returned to TSI after his baseball career. I directed him to work as a fitness manager [in West Caldwell, New Jersey], and that’s where Mike’s fitness career took off. He already had the passion and eagerness to learn more and further his education. He quickly became the smartest guy with the most enthusiasm in the club.”

LIFELONG LEARNING WITH A FOCUS ON MASTERY
With a clear understanding that he could not rest on his personal athletic experience, Piercy focused on bolstering his education with a view to becoming the best trainer possible. In 2011, while still working at the club, he undertook a master’s program at California University of Pennsylvania. He graduated in 2013 with an MS in exercise science with a concentration in performance enhancement.

As a strong believer in continuing education, he also undertook multiple trainings and certifications. In retrospect, however, Piercy thinks that less is better and advises today’s fitness professional to focus on a specific niche. “For example, if you want to train athletes, you must do PES.”

“Just because someone is a great athlete does not mean that they can train others. Being a great trainer and coach are different skills from being a great athlete.” —Michael Piercy, MS

BEING A COACH
According to Dan McDonogh, senior manager of performance training and sports marketing for Under Armour, Piercy recognizes that his role is not to show others how great an athlete he is, but rather to help others get to where they need to go. And, as a coach, he knows the what, when, why and how of enabling clients to do this. “Piercy has the top qualities that are needed to be successful in the fitness industry.”

Putting these qualities into practice helped to establish Piercy as a trainer who could work with champions. “After I returned full-time to the club,”

right tackle with the New York Giants for Super Bowls XLII and XLVI.”

McKenzie describes his training with Piercy: “The training not only kept me in great shape; it addressed any deficiencies that I had to keep me on the field for 16 straight games. . . . With [Piercy’s] help and expertise, I did not miss a single beat when we embarked on our Super Bowl Championship seasons.”

With Piercy establishing himself as a successful trainer, he experienced another significant turning point in his career when, in 2011, he participated in The Under Armour Global Training Symposium. “At that program,” he says, “[I] met key people with TRX®, and that would be the beginning of my relationship with them.” This was also where he found a mentorship program, leading him to

Mentoring
Larry Indiviglio, MA, MBA, president of INDsights-ForLife Inc. and Mike’s coach from 2011 to 2016, says, “Mike progressed from a fitness professional teaching at a large corporate-owned facility to one of the finest certification instructors with the TRX brand; one of the best presenters at major fitness conferences; author of The Men’s Health 30-Minute Shred (Hearst 2017); a gym owner; and—his ultimate goal—the 2017 IDEA Personal Trainer of the Year. As his coach, it’s so rewarding to see his success and fulfillment in life.”
Larry Indiviglia, MA, MBA, president of INDSightsForLife Inc. “I acted as Mike’s coach for 6 full years (2011–2016),” says Indiviglia. “We learned from each other and had a very special connection.”

PROFESSIONAL DEVELOPMENT AND TEAMWORK
Applying his belief in the value of coaching, Piercy was open to those who wanted to participate in his career development, which led to forming relationships with individuals at different brands. With each brand relationship, he notes, “I met a key person who helped me move my career.”

In his journey from childhood dream to thriving studio business, Piercy has put his heart into every step. Keeping an even keel—with tenacity and commitment—he has actualized his business goals and continues to dedicate himself to lifting the industry higher.

After initially meeting TRX representatives in 2011, Piercy became a master trainer. In 2013, he received the TRX FACEUP Award for overall instructor of the year. He met McDonogh at TRX and became a member of the Under Armour training team in 2017. Katai recruited Piercy to be a master instructor for BOSU® and Surge® in 2019.

In addition to leading local trainings, Piercy began presenting at conventions. “I love speaking and presenting. It gives me a chance to contribute to making our fitness industry better.”

In a 6,000-square-foot training facility. Services include sports performance training, personal training, group training (including the Under Armour 360 program), TRX programs, his signature 30-minute workout programs and a new online training program, The LAB Mobile.

As a former youth athlete, Piercy is dedicated to youth sports. The LAB offers strength and conditioning and performance programs for local youth sports academies and schools. The training focuses not on specific sports skills but rather on the refinement and enhancement required for athletes to play at their best.

Piercy likes to give his clients the experience of training like an athlete. “What’s really different when you’re an athlete is that you’re training for a specific performance. People

Fulfilling a Dream: Opening The LAB in 2012
“I’ve always dreamed of having my own place,” says Piercy. And, in May 2012, the dream was fulfilled with the opening of The LAB: Performance and Sports Science in Fairfield, New Jersey (@thelabsports). The LAB’s training philosophy is FUN: functional movement, usable movement, naturalistic movement.

After moving from his first location, Piercy is now settled in his journey from childhood dream to thriving studio business, Piercy has put his heart into every step. Keeping an even keel—with tenacity and commitment—he has actualized his business goals and continues to dedicate himself to lifting the industry higher.
How to Build a Successful Business

“The journey’s been long, but at the end of the day, it’s all been worth it.”

Michael Piercy claims to have made his share of hits and misses along the way to building his studio, The LAB, into the success it is today. Here are lessons learned from the trenches.

GET OUTSIDE EXPERIENCE. “Before you open your own business, apprentice first. Before you become one, . . . understand what it really means to be a business owner.”

LEARN FROM EVERY EXPERIENCE. “Long before I got my own business, I paid attention in every job that I had. I always asked myself, ‘How can I make this better?’”

IDENTIFY YOUR NICHE. “Today’s consumers are educated and know what’s out there and what they want to do. Once you identify who you want to train, direct your continuing education toward becoming expert in that specialty.”

ATTEND CONFERENCES. “Get out of the gym, go to conferences like NASM’s Optima, meet people. Get exposed to different people and different ideas.”

GET CONTINUING EDUCATION. “Take advantage of training from organizations like NASM to raise yourself and this industry that we love up to the next level.”

A Coach’s Heart and an Educator’s Dedication

In his journey from childhood dream to thriving studio business, Piercy has put his heart into every step. Keeping an even keel—with tenacity and commitment—he has actualized his business goals and continues to dedicate himself to lifting the industry higher.

He is as passionate about the success of other fitness professionals as he is about his own: “We all love this industry. If there’s anything I can do to help another fitness pro give his or her clients a better experience, I want to help.

“You have to live outside your comfort zone. You have to find ways to put yourself in situations where you need to stretch. We want people to be skillful at this craft. We want people to study it, respect it, do mentorships, do internships, take it seriously. It’s an awesome trust when people come to us to train. We need to appreciate that.”

SHIRLEY ARCHER, JD, MA, was the 2008 IDEA Fitness Instructor of the Year. She’s a mindful living coach; a yoga, Pilates and meditation instructor; and an award-winning author, whose books include Pilates Fusion: Well-Being for Body, Mind and Spirit. Reach her at shirleyarcher.com, @shirleyarcher (Twitter), @shirleyarcher (Instagram) and @shirley_archer (Pinterest).
Vu Nguyen was strong and fit. He didn’t drink or smoke. But on a sweltering July day in 2018, the 50-year-old Cleveland police officer collapsed during a 1.5-mile run that was part of a training exercise. He died 4 days later. Medical authorities blamed rhabdomyolysis, a rare but serious medical disorder that can result from overexercising (Hein 2018). In another incident that grabbed headlines, the Paralympics snowboarder Amy Purdy issued a plea to friends and fans from her hospital bed: “You have to listen to your body. When it is telling you to stop, stop!” Purdy, a double amputee who also competed on Dancing With the Stars, pushed too hard doing pullup sets while training for the 2016–2017 snowboarding season. She was sore for a day then noticed swelling in one arm, which sent up a red flag. She knew about rhabdomyolysis because it had landed a friend of hers in the hospital the year before. Purdy survived, but it was a long and occasionally painful recovery (Mateo 2018).

I’ve been warning fitness professionals about the risks of rhabdomyolysis—or “rhabdo,” as some of us call it—for more than a decade. While athletes and fitness enthusiasts who engage in high-intensity exercise are the most obvious candidates for rhabdo, it can also happen to novices and people trying an activity they haven’t done before. Since veterans and newcomers alike are vulnerable to the disorder, fitness pros need to understand the causes, symptoms and tactics for prevention. This brief overview will give you the basics.

**Rhabdomyolysis: The Fundamentals**

Rhabdomyolysis (rab-doe-my-OH-li-sis) occurs when striated muscle fibers rupture, releasing their contents into the bloodstream. This can have serious consequences that may require hospitalization.

Rhabdo can result from a variety of conditions, including blunt trauma, surgery, burns, drug and alcohol abuse, poisoning, electrocution, infections, and even some medications. When exercise triggers the disorder, we call it exertional rhabdomyolysis or exercise-induced rhabdomyolysis (Kim et al. 2016). Some evidence hints that exertional rhabdomyolysis may be on the rise (Knafl et al. 2018), though we don’t know for sure how often it occurs.

**Causes of Exertional Rhabdomyolysis**

The condition usually follows engagement in high-volume, high-repetition, intense or unfamiliar exercises or activities. Exercising in the heat and pushing beyond one’s physical capabilities can play roles in rhabdo.

The biochemical mechanism of exertional rhabdomyolysis is not fully understood (Kim et al. 2016). It is thought that...
Hitting it too hard during workouts can cause muscle to leak into the blood—a potentially lethal condition. Here's what it looks like and how to prevent it.
intense activity significantly depletes adenosine triphosphate (ATP) levels faster than they can be restored. This causes dysregulation of cellular sodium, potassium and calcium concentrations and an increase in free radical production. Ultimately, this leads to a breakdown in cytoskeletal membrane integrity, allowing cellular components to enter the blood.

**SYMPTOMS, RISKS, INCIDENCE**

Fitness professionals should not underestimate the hazards of rhabdo, which can cause many risky conditions and symptoms:
- heart rhythm abnormalities and heart attacks
- kidney failure
- severe muscle pain
- muscle weakness, swelling and bruising
- elevated liver enzymes


**BROWN URINE**

Fitness pros may have heard about one rhabdo symptom: dark-colored urine, often described as looking like iced tea or cola. The color change happens because high levels of the muscle protein myoglobin get into the urine during the kidneys’ blood-filtering process. Excessive myoglobin is toxic to the kidneys and can cause kidney failure. Indeed, some people may require dialysis to protect against kidney damage. Note that while darkened urine is the best-known symptom of rhabdo, it doesn't happen to everyone with the condition.

**MUSCLE SWELLING**

Many people with rhabdo report swelling of the muscles used in the activity they were doing. The medical term is **compartment syndrome**, which results from increased fluid pressure inside muscles after an injury or physical trauma (which can be caused by overexertion). This swelling is not like the temporary “pump” some gym-goers look for after exercise. Compartment syndrome is serious and painful because it can cut off blood supply to muscles. It can also cause muscle weakness and an inability to bend or extend limbs. Some people have reported being unable to fit into clothing because of the swelling. Sometimes, surgery is required to relieve the pressure.

**INCIDENCE**

The incidence of rhabdo in the general population is not well-known. Most reports do not get published by clinicians. Some individuals who develop the condition never go to the hospital, further reducing the number of cases reported.

Literature reviews usually quote 26,000 cases each year from all causes, many of which are attributed to exercise (Sauret, Marinides & Wang 2002). Unfortunately, these statistics date to the 1990s. More recent data on the prevalence...
of exercise-induced rhabdomyolysis in the general population cannot be located.

PATIENT PROFILE
Much of what we know about exercise-induced rhabdomyolysis comes from reports of hospital admissions. These reports have documented rhabdo in many different groups:

- marathon runners
- elementary school students
- police academy cadets
- soldiers in training
- hikers
- bodybuilders
- high school gymnasts and wrestlers
- group exercise class participants
- college swimmers and football players
- people who were gardening

As this list suggests, exertional rhabdomyolysis can occur in both fit and unfit individuals. Though high-profile
In some cases, rhabdomyolysis erupts after exercise and activities people are not accustomed to doing. For fitness trainers—whose clients are often novices—this is an important point to remember.

rhabdo cases occasionally make it into news media reports, I suspect that a large number of instances go undocumented. Do a quick check on #rhabdo on your favorite social media channels and see for yourself.

EXERCISE INTENSITY
Exercise intensity seems to increase the risk of rhabdo, and it’s important to remember that activities which don’t seem intense to fitness professionals may seem so to clients at a lower fitness level.

That said, intensity is not the only factor. In some people, activities not considered intense can initiate the disorder. For example, one report noted that a 29-year-old man developed rhabdomyolysis in his abdominals after performing 30–40 situps a day for just 5 days (Kao et al. 1998). The man in this report said he was a novice and not accustomed to exercise. In another report, a 55-year-old man developed rhabdomyolysis and kidney failure after gardening for several hours (Vucicevic 2015).

These reports highlight an often-missed aspect of exertional rhabdomyolysis: It appears to erupt after exercises and activities that people are not accustomed to doing. For personal trainers—whose clients are often novices—this is an important point to keep in mind.

In summary, the risk of rhabdomyolysis generally increases with the intensity, volume, repetitiveness and novelty of the activity or exercise.

DIAGNOSIS
Medical professionals have many ways to determine if someone has rhabdo, including checking for muscle swelling, weakness and pain and taking a detailed health history. Physicians often test for elevated levels of an enzyme called creatine kinase (CK), also known as creatine phosphokinase (CPK) (Keltz, Khan & Mann 2014). CK can be a marker of muscle damage.

While exercise can raise CK levels, rhabdo can push them to more than 10 times higher than normal. Don’t be surprised if your post-rhabdo clients tell you how high their CK levels rose.

Doctors also test for myoglobinuria—the presence of myoglobin in the urine (Keltz, Khan & Mann 2014). Tests scan for electrolyte imbalances and elevated liver enzymes, as well. Thus, there is more to diagnosing rhabdo than the color of someone’s urine.

As a certified personal trainer, it’s important to realize that just about every client you work with may be susceptible to common injuries and ailments, ranging from lower-back pain to anterior cruciate ligament tears to shoulder pain. NASM’s Corrective Exercise Specialization applies to all clients, meaning you’ll offer increased value to new and existing customers. Obtaining the NASM-CES demonstrates your continued passion and investment in education. Establish yourself as a fitness industry leader today: nasm.org/ces.
HYDRATION

Drinking large amounts of water to combat rhabdo appears to be a popular home remedy online. While fluid intake may mitigate rhabdo's damage to the kidneys, it does not address other effects, such as liver and heart issues. In theory, overhydration could lead to hyponatremia (water intoxication), which can be just as serious as rhabdomyolysis. Some research suggests that hyponatremia may make exercise-induced rhabdomyolysis more likely (Chlíbková et al. 2015).

(Editor's note: For an in-depth look at hydration, read “Hydration: Through the Lens of Fitness and Health” in the Spring issue of American Fitness.)

RHABDO VS. DOMS

Do not confuse rhabdomyolysis with delayed-onset muscle soreness (DOMS). While the pain from DOMS and rhabdo may coincide, there's an easy way to tell the difference: DOMS hurts only when the exerted muscles move. It doesn’t hurt when they are at rest.

On the other hand, rhabdo pain is often present at rest—and is frequently described as unbearable. Some people have reported that the pain began soon after they stopped exercising, growing in intensity as the hours went by.

RHABDO AND PAIN RELIEVERS

Because people can confuse DOMS with rhabdo, they may be tempted to reach for over-the-counter (OTC) analgesics like aspirin, ibuprofen (Advil) or acetaminophen (Tylenol) to deal with the pain. As a fitness pro, it's outside your scope of practice to recommend medications, but you need to understand that OTC pain relievers can increase stress on the kidneys and liver, potentially making rhabdo worse. If your clients have rhabdolike symptoms, refer them immediately to their physician for a formal diagnosis and proper medical attention.

RHABDO PREVENTION

How can fitness trainers reduce the odds of a client accidentally getting rhabdo during workouts? After reviewing the research and speaking to many who have developed this disorder, I suggest these guidelines:

NOVICE TRAINING

- Avoid high-volume, high-intensity programs that novices are not accustomed to doing.
- Be careful about single-body-part training or split routines. Spread the exercise stimulus over a wide array of muscle groups.

CIRCUIT TRAINING

- Employ total-body circuit training with lighter resistance. These workouts also improve strength and body composition (Takahata 2018). They are efficient and

SAM E CB IT

Circuit training consists of a series of exercises that a client performs one after the other, with minimal rest between each move. The typical acute variables for a circuit training program include a low-to-moderate number of sets (1–3), with moderate-to-high repetitions (8–20) and short rest periods (15–60 seconds); however, these variables can (and should) be manipulated to meet the needs of the client and to avoid overuse injuries. Try the sample circuit below, or use it as a template for inspiration.

1. dumbbell chest press
2. single-leg cable row
3. squat to shoulder press with stability ball
4. single-leg dumbbell curl
5. supine dumbbell triceps extension on stability ball
6. step up to balance
7. rest

For additional programming details, refer to NASM Essentials of Personal Fitness Training (Jones & Bartlett Learning 2018).
fit well with the 30-minute personal training sessions typical at many gyms today.

- Because circuit training programs involve more overall movement than multiset programs, they tend to be more fun, especially for beginners. This may translate into greater exercise adherence. (See "Sample Circuit," page 45, for an example.)

GROUP TRAINING
Group exercise instructors have a more difficult challenge because they often do not know who will be in their class until it begins. To reduce the risk of rhabdo in group classes, adopt these strategies:

- Take time to educate participants about rhabdo and tell them what to watch out for. Fostering an open environment encourages class attendees to listen to their bodies, work at their own pace and not feel embarrassed if they need to leave class before it’s over.
- Encourage new participants to prepare themselves for a group exercise class by first performing lower-intensity activities on their own, ideally using movements they will experience in the class. For example, suggest they ride a stationary bike on their own for several sessions before taking an indoor group cycling class.
- Offer beginner group exercise classes, which allow people to get familiar with exercises and movement patterns while under the guidance of instructors.

PROMOTE CAUTION
Exertional rhabdomyolysis sounds scary. And, yes, it can lead to serious health issues, but it doesn’t have to. Education is the best defense. Fitness professionals can play a leading role in helping people understand the risks of rhabdo and know how to grow stronger without getting hurt.

Joe Cannon, MS, is a leading authority on exercise-induced rhabdomyolysis. He’s the author of Rhabdo: The Scary Side Effect of Exercise You Need to Know About (CreateSpace 2017). He’s been a fitness trainer since the 1990s, trains fitness pros for AAAI/ISMA and has appeared in a variety of publications. Find out more at Joe-Cannon.com and SupplementClarity.com.

References for this article available online at magazine.nasm.org.
Proper assessment and training of the foot musculature are vital to optimal health. Given that the feet are our foundation and interact with our environment daily, it affects the whole body if they hurt. The American Orthopaedic Foot and Ankle Society categorizes problematic foot and ankle issues by specific area: Ankle, midfoot, heel and big toe are primary categories (AOFAS 2019). However, given the abundance of research, data and overall information on foot and ankle conditions, there is not enough room to cover every category here, so this article will take a narrower focus: the midfoot and the heel.

The Foot Bone’s Connected to the . . .

As the old song goes, “The foot bone’s connected to the . . . hip bone”? At some point in their education, fitness professionals learn about the kinetic chain. This has been described as “the interconnected linkage of all joints in the body,” which allows force to be transferred from the nervous system to the muscular and skeletal systems (NASM 2014). In other words, movement of the foot influences the knee, the hip and even the spine. Here is a review of these influences, working from the ankle upward.

**SUBTALAR JOINT TO TIBIA.** Motion at the subtalar joint has a direct link to motion in the tibia. As the subtalar joint pronates, the tibia internally rotates, and as the subtalar joint supinates, the tibia goes into external rotation (Powers 2003). The reverse is also true: The subtalar joint responds as movement is induced in the tibia.

**TIBIA TO FEMUR.** It is important to recognize that during functional tasks, such as walking, running, squatting and so on, the femur responds to movement of the tibia. During internal tibial rotation, the femur moves into internal rotation and adduction. Conversely, during external tibial rotation, the femur moves into external rotation and abduction (Powers 2003).

**FEMUR TO PELVIS.** As the femur moves, so must the pelvis. An excellent example of this pelvic motion comes from a study conducted by Khamis et al. (2015), who found that inducing hyperpronation with a lateral wedge significantly affected lower-extremity and pelvic alignment. The researchers concluded that foot pronation caused internal rotation of the tibia, further...
Sample: Two Integrated Programs

Both sample programs shown here can be a part of a client’s weekly training sessions. Which program is primary and receives most attention will depend on the problem’s root cause: foot and ankle or hip and pelvis. For example, if the foot and ankle are chief concerns, the client might perform the Foot and Ankle Stabilization Endurance Program 3–4 days per week while completing the Hip Stabilization Endurance Program only 2–3 days per week.

FOOT AND ANKLE STABILIZATION ENDURANCE PROGRAM

If the foot and ankle are identified as the root cause, then a stabilization endurance program specific to the foot should be implemented. The program begins with foam rolling and static stretching of overactive muscles such as the gastrocnemius/soleus (calves), peroneals and biceps femoris (hamstrings). Then comes a basic core exercise, such as a prone or side plank, to wake up the important stabilizers. The next step integrates balance training, which fires underactive muscles such as the intrinsic muscles of the foot, including the posterior and anterior tibialis. The program then concludes with a total-body integration exercise.

Step 1: Inhibit: Self-Myofascial Release

Hold tender spots for 30 seconds.

Step 2: Lengthen: Static Stretches

Hold each stretch for 30 seconds; complete 2 sets.

Step 3: Activate: Isolated Strengthening

Do 6–8 reps with 10-second isometric holds.

Step 4: Integrate: Integrated Dynamic Movements

Balance:
Perform 9–10 reps per side.

Total-body integration:
Do 10–15 reps per side, slow tempo.

The compensations of pronation distortion syndrome are closely associated with the common aches and pains of the foot. The flattening and turning out of the foot can overload the plantar fascia, causing midfoot or heel pain.
HIP STABILIZATION ENDURANCE PROGRAM

If the foot and ankle are not identified as the root cause, then a simple hip program should be implemented. The program begins with foam rolling and static stretching of the adductors, tensor fasciae latae and biceps femoris. The next step is core activation, which should focus on the gluteus maximus/medius and core stabilizers. The program then concludes with a total-body integration exercise.

Step 1: Inhibit: Self-Myofascial Release

Hold tender spots for 30 seconds.

Step 2: Lengthen: Static Stretches

Hold each stretch for 30 seconds; complete 2 sets.

Step 3: Activate: Isolated Strengthening

Do 12–20 reps, 2 sets, 4-2-2 tempo. (Focus on form.)

Step 4: Integrate

Perform 12–20 reps, slow tempo.

leading to internal femoral rotation and a subsequent anterior tilting of the pelvis (i.e., the front of the pelvis moved toward the floor). In an earlier study, Rothbart and Estabrook (1988) indicated that excessive pronation during gait leads to a functional shortening of the leg and an anterior pelvic tilt, which may eventually cause weakness of the glutes and sacroiliac joint dysfunction.

Functional changes in the foot can also impair optimal muscle-firing sequences at the hip. Lee, Jeong & Freivalds (2001) demonstrated that a 2- and 3-inch heel lift induced a 45- and 60-degree anterior pelvic tilt, respectively. Further, Mika, Clark & Oleksy (2013) found that a heel lift of more than 3.5 inches (10 centimeters) led to significantly earlier contraction of the erector spinae and delayed firing of the gluteus maximus during trunk flexion tasks. Granted, 10 cm is higher than the average high-heeled shoe. However, it should be clear that changes in the foot’s position significantly affect function in the rest of the body.

CORE TO SUBTALAR JOINT. While the importance of a solid foundation cannot be overstated, one must also be cognizant of foot dysfunction that originates at the core. In a thorough review of the literature, Barton et al. (2013) concluded that delayed firing of the gluteus medius or reduced endurance in this muscle was associated with poor hip control in the frontal and transverse planes. A lack of control at the hip is likely to allow internal femoral rotation and alter kinematics at the knee.

As discussed in the previous paragraphs, if movement of the subtalar joint causes movement in the tibia, which in turn causes movement in the femur, then it is reasonable to assume that the effects can trickle downward, too: Movement in the femur can cause movement in the tibia, which can then cause movement at the subtalar joint (i.e., foot flattening or excessive pronation).

FOOT TO . . . ANYTHING ELSE? Fitness professionals must recognize that foot dysfunction is never isolated to the foot. Other dysfunctions, such as knee, lower-back or even neck issues, may be related to the foot and ankle. Or, perhaps, foot dysfunction itself is originating from somewhere up the chain. Therefore, if fit pros are going to provide the best program possible, both the assessment process and the ideal
intervention need to isolate and address the many potential causes of a problem.

**The Midfoot: Low Arches**
The midfoot—the area just in front of the heel and behind the metatarsal joints—is a key site of foot pain. A low arch or flat foot is one of the most common conditions of the midfoot. All too often, individuals with flat feet choose to mask the problem by purchasing a simple over-the-counter insole versus truly taking the time to identify the root cause of the problem and come up with a probable solution.

**CAUSES AND CHARACTERISTICS.** Flat feet can be caused by a deformity in the bony structure of the foot (i.e., the bones do not form an arch naturally), or the cause may be functional (i.e., there is an arch, but the muscles have become too weak to maintain it). A flat foot has been defined as “medial rotation and plantar flexion of the talus, eversion of the calcaneus, collapsed medial arch and abduction of the forefoot” (Pita-Fernandez et al. 2017). Thus, it is clear that a flat foot is a multidimensional impairment. This should provide insight into the difficulty in diagnosing and treating the condition.

Pita-Fernandez et al. found that more than 26% of a random population sample (n = 835) demonstrated clinically flat feet. These individuals were, on average, older (about age 65) and had a higher body mass index (~31.5). Interestingly, the authors stated that flat feet were not just painful in many participants; they also led to lower quality of life as compared with normal foot arches.

**TREATMENTS.** Common approaches for treating painful flat feet are the use of orthotics (arch-supporting shoe inserts) and participation in physical therapy, depending on the etiology of the condition. However, unless the issue is caused by a structural deformity of the bones, using inserts is simply masking the problem. While this may prove advantageous in the short term, relying too heavily on orthotics may lead to other problems in the long term, such as altered knee and hip mechanics.

**Heel Pain and Plantar Fasciitis**
Heel pain has often been described and categorized as plantar fasciitis, stone bruise or a heel spur (AOFAS 2019). In reality, most people tend to self-diagnose all heel pain as plantar fasciitis. However, this diagnosis can sometimes be false because, while the plantar fascia may indeed be irritated, it could be degeneration of tissue or irritation of nerves near the heel that is causing the problem. For that reason, this article will focus on the general meaning of plantar fasciitis (i.e., irritation of the plantar fascia).

**CAUSES AND CHARACTERISTICS.** Muth (2017) defined plantar fasciitis simply as irritation or straining of the plantar fascia, a band of tissue that runs along the bottom of the foot. The most common symptoms are pain near the heel or pain in the arch of the foot.

The causes of plantar fasciitis can vary from excess weight to excess activity to excessively pronated or excessively supinated feet. Among exercisers, the condition is more often found in people who perform high-impact activities like running, jumping or dancing. However, the important thing to remember is that, regardless of the root cause, it is excessive strain on the tissue that leads to pain and discomfort.

**TREATMENTS.** Gutteck, Schilde & Delank (2019) more eloquently explained plantar fasciitis as “multifactorial in origin and . . . a mechanical overloading reaction to multiple instances of microtrauma.” One potential cause of excess loading of the plantar fascia is decreased range of motion in the posterior lower leg. Patel & DiGiovanni (2011) found that out of 254 patients, 211 had limited ankle dorsiflexion, 154 had restriction in the gastrocnemius, and 66 had restriction in both the gastrocnemius and soleus. These are key findings, since they indicate that identifying and improving ankle dorsiflexion may be the first step in reducing repetitive mechanical loading of the plantar fascia.

**Assessments: Where Does the Problem Start?**
The foot is one of the most complex areas of the body, considering how many bones, joints and muscles the foot has and how many complex movements it can perform. Bowman (2017) explains that each bone in the foot—there are 26—is capable of a mechanical overloading reaction to excessive activity or injury. Following the sequence allows you to rule out various problems—and hone in on where the compensation is originating.

**Note:** It is very important for any person experiencing pain in the foot (or elsewhere) to have a full, thorough assessment completed by a physician.

**OVERHEAD SQUAT ASSESSMENT**
During the OHSA, a client should be able to (1) keep the feet pointing straight ahead with knees in line with the second and third toes; (2) keep close-to-neutral alignment
All too often, individuals with flat feet choose to mask the problem by purchasing a simple over-the-counter insole versus truly taking the time to identify the root cause of the problem and come up with a probable solution.

If the modification corrects the compensation, then the cause of the compensation is at the foot and ankle. If the modification does not correct the compensation, then the sample program for the hip, page 49, may be helpful.

Help Clients Put Their Best Foot Forward

In conclusion, although the foot is a complex area of the body, following a simple assessment logic can help identify the root causes of compensations that could lead to aches, pains, and other dysfunctions if not addressed. In reviewing this article, fitness professionals should begin to recognize the many compensatory patterns that can stem from or cause foot and ankle dysfunction. With this information, fit pros can create a program or programs designed to address those compensations (see sample programs, pages 48–49) and, hopefully, prevent future pain—from the ground up!
Put an Outdoor Spin on Indoor Cycling Classes

FORGET VIRTUAL REALITY: INDOOR CYCLING INSTRUCTORS CAN TAKE THEIR RIDERS ON A BEAUTIFUL, CHALLENGING OUTDOOR RIDE—WITH A FEW TRICKS LEARNED FROM CYCLING PURISTS.

BY KRISTA POPOWYCH

Since disco balls and rhythm riding took the indoor cycling industry by storm, re-creating an outdoor ride indoors has taken a back seat. But this new spin on an old pastime can keep avid class members interested while getting some new bodies on the bikes in your studio.

Returning riders are one market sector that appreciates the idea of an outdoor ride. Perhaps these riders loved cruising along on the basket-bearing, banana-seat bike of their childhood but haven’t ridden since. And yet amateur cyclists may be iffy about mapping a route, fixing a flat on the fly and handling other inherent outdoor challenges. As curious as they are, hitting the road may not be realistic. But an outdoor-style indoor ride certainly is.

Neil Troutman, lead international master educator for Stages® Cycling, touts the benefits of indoor riding for outdoor enthusiasts and elite cyclists alike. Although cycling purists may prefer to hit the road and embrace the elements, studio rides provide excellent supplemental training in a controlled environment. Instead of contending with traffic, being pulled along by the pack or taking advantage of the draft, riders can train properly for given intervals and in the correct training zones, says Troutman.

“When it comes to riding a bike indoors, it is your bike, your endless road—no inter-
Riding the Switchbacks

Switchbacks—turns that are sharper than 90 degrees—provide a great visualization drill for riding indoors. On the road, switchbacks help to mix up a difficult climb. They can also be used to create distance between riders when done as a racing strategy.

**EXPLAIN THE BODY MECHANICS.** As with drafting, novice road riders may need help understanding how the body shifts position when tackling a switchback. When the rider is entering a switchback, the goal is to slow down, take it wide with the inside knee bent and lean slightly into the corner. The rider comes out of the saddle (weight on the outside handlebar) to accelerate around the corner, then sits down and lower the gear and increase the cadence. Next, have them gradually increase the gear at a steady pace while staying in the saddle (on the straightaway to the next switchback), then stand again to attack the next corner. Repeat.

**TEACH A SWITCHBACK ATTACK.** To apply a switchback experience in an indoor ride, encourage riders to attack out of the saddle around the imaginary corner, then sit down and lower the gear and increase the cadence. Next, have them gradually increase the gear at a steady pace while staying in the saddle (on the straightaway to the next switchback), then stand again to attack the next corner. Repeat.

**MAP THE ROUTE IN YOUR MIND.** Be sure you’ve imagined the terrain and route in your mind, then coach your class through the visualization of it. If you have access to technology, add that. There are, for example, plenty of videos of road rides through nature, cities, etc., which you can project on a screen as you cue changes in pace, standing/sitting and so on.

Although there are parallels between riding outdoors and riding indoors, the two will never be exactly the same. Nor should they be. Instead, aim for a great indoor cycling experience (for all levels of riders), bringing the best parts of road riding into the studio to create a winning combination.

A helpful technique for managing climbs is to tell riders to slide toward the back of their seat, as this will change the muscles’ firing patterns. Indoor riders often need to be reminded to shift back.

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BROUGHT TO YOU BY THE MOST TRUSTED NAME IN FITNESS: NASM
While away from home, it can be harder than ever for clients to stick to the healthy eating goals of their weight loss program. One way fitness professionals can help people stay on track is to suggest dietary self-monitoring throughout the day. This simple practice has been shown to help weight loss clients be more successful in reaching both short- and long-term goals—and recent research shows it may not be as time-consuming as people think.

A team led by Jean Harvey, PhD, RD, of The University of Vermont tasked 142 adults with recording their daily dietary intake for 24 weeks, using an online food tracker program. At the start of the study, participants were spending an average of 23.2 minutes per day recording their intake, but by month 6 it was taking them only 14.6 minutes—and the reduction in time had no significant effect on their weight loss results. As you might expect, those who logged on more often—at least two or three times per day—lost more weight, and those who skipped the process entirely never lost more than 5% of their baseline weight.

But clients need not be so high-tech to reap the benefits of food tracking, says Emily Bailey, RD, CSSD, LD, NASM-CPT, a certified wellness, sports and intuitive eating dietitian based in Columbus, Ohio. “I typically recommend using the good ol’ pen-to-paper [method] or the Notes app on your phone, versus dealing with the learning curve of an app,” she says. “I also suggest recording hunger/satiety, energy, mood, etc., along with food type and portion.” Tracking internal cues as well as calories and macros raises self-awareness, which is key to success.

Bailey adds that the goal should not be to restrict oneself on vacation (or at any time, for that matter). “Indulging is part of healthy eating,” she says. “I use the 80/20 guideline: 80% of the time, choose foods that are high in nutrients, and 20% of the time, choose foods that feed your soul. There are 21 meals in a week. This equals approximately four meals to allow indulgence and let life happen.”

**Did you know?** You can use the NASM Edge app to help clients keep track of their nutrition goals.
These are a few foods and substances found to cause gastrointestinal problems in some exercisers:

- apples
- asparagus
- dairy foods
- grain products
- legumes
- onions
- pears
- sugar alcohols (e.g., sorbitol, mannitol, xylitol)

Competitive runners have known for years that certain foods can either help or hinder a successful run. New research out of Anglia Ruskin University in Cambridge, England, has added to our body of knowledge—specifically regarding recreational athletes.

The study, published in the *Journal of the International Society of Sports Nutrition*, reported that a low-FODMAP diet helped prevent gastrointestinal distress more than a high-FODMAP one (2019; 16 [1]). FODMAPs are fermentable oligosaccharides, disaccharides, monosaccharides and polyols.

Though the crossover study had a small sample size of only 16 healthy runners, 69% of those following the low-FODMAP diet experienced a “reduction in exercise-related gastrointestinal symptoms,” according to co-author Justin Roberts, PhD.

As for the “poor diet” study, researchers at the School of Public Health at Loma Linda University in California looked at food consumption data collected on 27.7 million adults from 245,891 surveys over a 10-year period. The research team concluded that a lower intake of fruits, vegetables and water—along with greater consumption of french fries, fast food, soda and added sugar—was linked to higher rates of moderate-to-severe psychological distress. This was true regardless of gender, age, income level, education or marital status. According to Jim E. Banta, PhD, MPH, lead author of this study, “Perhaps the time has come for us to take a closer look at the role of diet in mental health, because it could be that healthy diet choices contribute to [it].”

A February study in the *International Journal of Food Sciences and Nutrition* found a link between poor diet quality and poor mental health, while a separate analysis conducted by researchers from the University of Leeds in England found a correlation between fruit and vegetable consumption and mental well-being. Here, some details on each:

The University of Leeds study—which followed more than 40,000 people over a 7-year period—found that just one extra portion of produce a day could have an effect on mental well-being equivalent to adding eight 10-minute walks a month. Further, both quantity and frequency were important; when each of them increased, people’s reported well-being improved in a dose-response fashion.

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The researchers theorized that GI improvements stemmed from a reduction in indigestible carbohydrates available for fermentation in the gut, which in turn reduced the volume of water and gas in the intestines.

While trainers may want to encourage clients with exercise-related gut problems to consider a low-FODMAP diet, it is also important to recommend they consult with a physician to rule out other health problems and discuss dietary changes. Adopting a restrictive diet such as this, adds Roberts, can be both difficult and stressful for the layperson and may affect overall nutritional intake if not approached properly.

### CAN RUNNERS REDUCE GUT SYMPTOMS WITH THE RIGHT DIET?

**Junk Food, Junk Mood, Good Food, Good Mood**

While it has long been accepted that eating more produce is advantageous for our physical health, it’s now apparent we must adopt the motto “Lettuce Be Happy,” as well. A February study in the *International Journal of Food Sciences and Nutrition* found a link between poor diet quality and poor mental health, while a separate analysis conducted by researchers from the University of Leeds in England found a correlation between fruit and vegetable consumption and mental well-being. Here, some details on each:

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After 15 days of supplementation with a combination of peanut husk extract (luteolin) and mango leaf extract (mangiferin), a group of healthy male university students from Spain showed improvements in exercise performance, including increases in brain oxygenation and muscle oxygen extraction, that lasted for at least 48 hours. The 12 students received either a placebo or a low or high dosage of the supplement combination: 50 milligrams per day of PHE plus 140 mg/day MLE, with 100 mg mangiferin, or 100 mg/day PHE plus 420 mg/day MLE, with 300 mg mangiferin. Both low and high dosages were positively associated with enhanced exercise recovery, though the higher dose was more strongly associated with enhanced brain oxygenation than the lower dose. Note: This research, published in *Nutrients*, was partially financed by Nektium Pharma (who provided the supplements) (2019; 11 [2], 344).

For those who enjoy the flavor of mangoes, eating the fruit (fresh or frozen) may be a more enjoyable option. A review of the anti-inflammatory benefits of mangoes published in *Functional Foods in Health & Disease* offered this conclusion: “A large number of studies established the immunomodulatory and anti-inflammatory potential of mangiferin. Significantly, mangiferin at different doses increased ATP levels, which can thereby intensify strength, stamina, vitality, and vigor. Overall, mango, especially mango leaf extract enriched in mangiferin . . . may have tremendous potential in mitochondrial energy homeostasis, endurance, and exercise performance” (2018; 8 [5], 267–79).

*TURNTHEPAGEFORKANGO-FILLEDRECIPES!*
RECIPES

3 Ways to Tango With Mangoes

Certified wellness and health coach Stephanie Weaver, MPH, of San Diego offers several mango-based dishes on her website, MigraineReliefRecipes.com, and in her book *The Migraine Relief Plan: An 8-Week Transition to Better Eating, Fewer Headaches, and Optimal Health* (Agate Surrey 2017). “Mangoes are one of the few tropical fruits that are not a known migraine trigger,” she explains. “They are also an excellent dessert alternative, as they’re high in fiber and nutrients.”

Here, she shares three summery ideas for putting these fruits to use. (*Note: Not all ingredients below are migraine-friendly. Visit Weaver’s website to learn more.*)

**PEACH-MANGO POWER SMOOTHIE.** In a blender, combine 1½ cups of milk or nondairy beverage with 6–8 ice cubes. Add 2 tablespoons each of maca powder, unsweetened cacao nibs, buckwheat and chia seeds. Slice 2 peaches and 1 mango, reserving 2 peach slices for garnish, if desired. Blend until smooth.

**KALE-MANGO-COCONUT SALAD WITH TOASTED CASHEWS.** In a large bowl, combine 4 cups of finely shredded kale leaves (washed, stems removed) with the juice of half a lemon, 1 tablespoon of extra-virgin olive oil and ¼ teaspoon of sea salt. Massage the dressing into the kale until leaves are glossy and soft. Top with 1 sliced mango, 4 tablespoons of flaked coconut and 1/4 cup of toasted cashews.

**GRILLED MANGO WITH CASHEW-LIME CREMA.** Soak ½ cup of cashews for 30 minutes, then drain and blend them with 1 grilled jalapeño or chili pepper (seeds removed), 2 teaspoons of fresh minced ginger, ½ cup of water, and ½ cup of fresh lime juice until smooth. Add more water, as needed, until the mixture is pourable. Drizzle this “crema” over 2 sliced and grilled mangoes. Top with lime zest, cilantro leaves, smoked paprika, thinly sliced jalapeños, ground pepper and sea salt, as desired.

Smoothie recipe reprinted with permission from *The Migraine Relief Plan* (Agate Surrey 2017).

Other recipes reprinted with permission from Stephanie Weaver.

Women’s Sports Nutrition Products Aren’t Making the Cut

A recent marketing survey performed by Lumina Intelligence found that of 4,064 sports nutrition products (protein powders, protein bars, branched-chain amino acids, preworkout blends, creatines and nitric oxide boosters), only 2.1% target women—and the few products that do receive poor reviews from them.

In an article for Nutraingredients.com (March 2019), Thomas Morgan, market analyst for Lumina, noted that women’s products are not connecting with their target audience—possibly in part because of deceptive labeling. For example, only 37.5% of women’s preworkout blends state beta-alanine levels, as compared with 75.6% of those marketed to the general public. Morgan also mentioned the “pink-and-shrink effect,” whereby companies make a smaller, “girlier” version of their original product in hopes of appealing to women. However, women who have grown wise to the tactic may actually avoid these versions to avoid feeling ripped off or duped.

Brands “need to have the trust of the consumer,” he concluded. “Women are more empowered than ever before. Products in the gym just need to reflect [that].”
HEART HEALTH: GOING BLUE IS GOOD FOR YOU

The phytochemicals that are responsible for the blue color in blueberries—called anthocyanins—can significantly improve cardiovascular health, according to a two-part study published in The Journals of Gerontology: Series A (2019; doi.org/10.1093/gerona/glz047).

For the study, lead author Ana Rodriguez-Mateos, PhD, and colleagues divided 40 study participants into two groups: one group that drank a daily beverage containing 200 grams of blueberries (about 1.35 cups) and a control group that did not. After a month, the blueberry group showed an average drop in systolic blood pressure of 5 mm Hg (millimeters of mercury)—a result normally obtained with medication.

In comments reported on MedicalNewsToday.com (Feb. 2019), Rodriguez-Mateos concluded, “If the changes we saw in blood vessel function after eating blueberries every day could be sustained for a person’s whole life, it could reduce their risk of developing cardiovascular disease by up to 20%.”

For a delicious twist on a blueberry smoothie, combine your favorite nondairy beverage with blueberries, parsley, mint and vanilla protein powder.

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.
A Gut Check on Gut Health: What You Need to Know

THE TERMS MICROBIOME AND PROBIOTIC ARE FAMILIAR TO MANY AMERICANS, BUT FEW FULLY UNDERSTAND THEM. HERE IS AN OVERVIEW THAT DISTINGUISHES BETWEEN SCIENCE AND MARKETING HYPE.

BY JOSEPH WEISS, MD, & DANIELLE WEISS, MD

Each of us has held beliefs—obtained through observation, experience or even formal education—that were later found to be wrong. In fact, medical schooling begins with a warning: “Half of all that you will be taught will be proven false in the future, yet which half cannot be known at present!” Some recently “overturned” beliefs involve the human gut microbiome, beginning with its scope, its diversity and, currently, the various ways it affects and is affected by the body. Here is a review of what is known now and what is currently under investigation.

The Big Picture: The Human Microbiome

The human microbiome, as a whole, is the population of all microscopic life-forms that live and thrive within the human organism. Each area of our body—such as skin, ears, lungs or gut—has distinct microbial populations and diversity. Even within an organ, the microbiome can be unique to specific anatomical locations.

Today, the human microbiome is considered an organ system, revolutionizing our understanding of human health, disease and fitness (Baquero 2012). The human microbiome can easily and quickly be altered by an event or events like the introduction of antibiotics. This is, of course, also true of the subsets of this system, including the microbiome in the human gut.

Focusing In: Gut Microorganisms

The dimensions of the gut microbiome are described in astronomical terms. The 100 trillion microbes of the gut microbiome vastly outnumber the human cell population of 37 trillion. By gene count, the multiple is greater, with 20,000 human genes and several million microbial genes (Sender, Fuchs & Milo 2016).

The human gut microbiome contains several types of microorganisms, including bacteria, viruses, protists, fungi, parasites and prions (Alberts et al. 2002). A limited number are known to be pathogens, or microorganisms that can cause disease. Often a select strain or subspecies will give rise to a specific disease; for example, the microbe Salmonella typhi causes typhoid fever. If a type of microorganism is known not to cause harm, it is labeled a...
commensal and, if beneficial, it is called a symbiont.

For many years, it was believed there were only several dozen species of microbes in the gut, largely because of the ways microorganisms were identified. Traditionally, methods involved adding a special stain to a sample or observing the growth of colonies on a medium such as blood agar.

When gene sequencing was introduced, it allowed identification of microbes by their DNA and RNA. Scientists soon realized that the species count of gut microbes was actually in the millions. (Thus, until all species of gut microbiota are identified and investigated, our attempts at manipulating the gut microbiome with probiotics and other measures may lead to unintended consequences.)

DNA sequencing also led to another discovery about the diversity of microbes in the human gut. For decades, the classification system of life on Earth has included several domains, further subdivided into kingdom, phylum, class, family, order, genus and species. Then, in the late 1970s, Carl Woese, PhD, at the University of Illinois, Urbana-Champaign, discovered the ancient domain archaea (Sapp & Fox 2013). For many years, archaea were believed to be bacteria, but when their DNA was sequenced, they were found to be more alien than any form of life yet discovered.

Archaea are extremophiles—microorganisms able to survive in extreme environments (Rampelotto 2013). They have been found living in rocks, ocean floor volcanic vents, boiling mineral springs and even outer space. In fact, the new science of

Until all species of gut microbiota are identified and investigated, our attempts at manipulating the gut microbiome with probiotics and other measures may lead to unintended consequences.

The odds of the microbial species in your yogurt being exactly what the gut microbiome needs for optimal health would be like winning the probiotic lottery.
astrobiology considers them a prime candidate for the first life on Earth, perhaps having arrived from another solar system. Interestingly, they are also found in the human gut microbiome.

Recently, some surprising discoveries were made regarding gene transfer, as well. The belief that genes could pass to the next generation only by vertical transmission (from parent to offspring) was overturned by Nobel laureate Barbara McClintock, PhD, who discovered “jumping genes” (Ravindran 2012). These genes allow horizontal transfer of genetic information—that is, between two different species!

**HOW GENES AFFECT THE GUT**

Microbiome genes are essential for human survival. Genes from the microbiome—as well as from one’s diet and environment—may be active, be horizontally transferred or act as epigenetic influences (Carbonero 2017).

We are exposed to millions of genes and epigenetic factors from our diet, water and environment. Prebiotics, probiotics, symbiotics, diet, antibiotics, pharmaceuticals, toxins, sunlight, exercise, gender, air pollution, sleep, tobacco smoking, stress and other factors may influence gene expression and affect health and well-being (Conlon & Bird 2015; Kashanatova et al. 2016; Imhann et al. 2017; Allen et al. 2018; Clark & Mach 2017; Jašarević, Morrison & Bale 2016; Beamish, Osornio-Vargas & Wine 2011; Benedict et al. 2016; Reynolds et al. 2017; Lutgendorff, Akkermans & Söderholm 2008).

The biodiversity of food sources exposes the gut to millions of unique genes from tens of thousands of species and cultivars. Although there are concerns about ingesting genetically modified organisms (GMOs), they have been consumed for more than 10,000 years in various forms, from cross-bred cereal grains to livestock (Oliver 2014). Further, an international collaborative research program called the Human Genome Project discovered that 8% of the human genome is not of human origin and was horizontally transferred from ancient viruses, thus making humans fit the designation of GMOs. Additional research suggests that an even larger percentage of the human genome may have originated in other species (Fiorie et al. 2010).

The Impact of the Gut on the Body

There are several pathways of communication between the brain and gut, the most prominent being the vagus nerve (Breit et al. 2018). Of the active two-way communication, over 90% is from the gut to the brain (Bonaz, Bazin & Pellissier 2018). The gut microbiome houses some 70% of the immune system (Vighi et al. 2008) and communicates with the immune system, lymphatic system, endocrine system (hormones) and circulatory system. Metabolites, neurotransmitters, hormones, cytokines, electrical signals and inflammatory markers are generated by the gut microbiome itself—or from gastrointestinal cells influenced by it.

In the months and years to come, evidence-based science will identify specific strains of microbes as pathogens or symbionts, allowing therapeutic modification of the microbiome. Here are a few things currently known and under investigation.

**HEALTH CONDITIONS.** Changes in the gut microbiome are associated with a variety of health conditions, including autism, arthritis, cancer, heart disease, depression and others. Therapeutic microbes are likely to be identified for obesity (Rouxinol-Dias et al. 2016), heart disease, diabetes (Zeevi et al. 2015; Sanz et al. 2018) and other common conditions, opening new approaches to prevention and management (Kuntz & Gilbert 2017; Thursby & Juge 2017).

**LEAKY GUT SYNDROME.** The gut microbiome affects the tight junctions that maintain the integrity of the gut barrier.
When tight junctions are weakened, gaps between the cells of the intestinal lining may lead to “leaky gut syndrome,” which allows microbes, metabolites and toxins to pass from the digestive system into the bloodstream.

**MENTAL HEALTH.** Microbes that manufacture specific metabolites, hormones and neurotransmitters—such as serotonin, dopamine, acetylcholine or their precursors—may be utilized for mood disorders and are already described as psychobiotics (Sarkar et al. 2016; Bastiaanssen et al. 2018; Lach et al. 2018).

**OBESITY.** The gut microbiome aids in the digestion of food. Calorie and nutrient absorption, glycemic index and energy regulation are dependent on more than the food consumed. These functions also depend on the diversity of the gut microbial population, with specific species and strains of microbes extracting more calories from foods than others, potentially contributing to obesity as well as type 2 diabetes and metabolic syndrome.

**METABOLISM.** Some gut microbes may produce hormones similar to human hormones that regulate metabolism (such as DPP4-like activity). Others may modulate immune and metabolic function—for example, microbes may increase adiponectin levels in adipose tissue, increase AMPK activation in skeletal and adipose tissue, and alter ghrelin levels (Yanagi et al. 2017; Olivares et al. 2018).

**OVERALL HEALTH.** Exercise may express some of its benefits through the gut microbiome as well. And our circadian rhythm, which regulates sleep, both influences and is influenced by the gut microbiome.

**The End Goal: Diversity of Gut Microbiota**

Scientific evidence supports the belief that the greater the diversity of the gut microbiome, the healthier the individual (Lozupone et al. 2012). Although this is not proven knowledge, working toward eliminating antibiotics (as well as artificial sweeteners and herbicides, which have antibiotic properties) from the food supply would seem logical, since antibiotics kill friendly gut bacteria as well as harmful ones (Prashant et al. 2012). It would also seem prudent to encourage microbiome diversity through the consumption of a variety of fermented and gut-friendly foods, such as kimchi, yogurt and sauerkraut.

Unfortunately, the probiotic industry has a profit motive—of about $50 billion per year (Turner 2016)—to turn this logic on its head, encouraging the consumer to swallow a commercial product that contains billions of just one (or a few) microbial species—every day, indefinitely. Doing so, however, tends to support microbial uniformity of the gut, which is the opposite of the desired diversity. That said, the odds of the microbial species in a yogurt being exactly the ones that the gut microbiome needs for optimal health would be like winning the probiotic lottery.

Simply put, our health and well-being may be dependent on our microbiome diversity. Thus, when it comes to probiotics, we would be well served to follow the wisdom of the great 18th century Scottish enlightenment philosopher David Hume: “A wise man proportions his belief to the evidence.” It’s a small world after all—especially in the microbiome!
Our fitness careers demand an almost nonstop service-oriented approach to work. Unfortunately, constantly empowering other people’s wellness can leave us feeling empty, which is why I often tell people I mentor, “We can’t serve tea from an empty teapot.” We have to learn to care for ourselves without harming our fitness careers. Including some nontraditional, yet effective, self-care options in our regime can help us keep our teapots full while also broadening our career paths. Let’s look at a few ways to make that happen.

Get Social
Several online support groups let fitness instructors mingle virtually, ask questions and share proven answers to common issues, such as feeling too sore to teach or having to work at facilities that lack microphones. One example is the Facebook group Ageless Movers International, run by Bernadette C. O’Brien, MEd, one of the most chronologically certified group fitness professionals and personal trainers in the industry. Her social media group encourages instructors and trainers of both wet and dry modalities to interact, weigh in on concerns regarding aging, get references to self-care resources and apply research-based approaches to working with people over 60. Also, many fitness pros offer YouTube videos packed with tips on breathing, self-massage and meditation strategies.

Regularly scheduling limited amounts of time for social media groups and video playlists can enable us to stay on top of our careers by helping us to take care of ourselves. Self-care includes steps like protecting our voices before we develop symptoms of overuse.

Janie Watkins, RYT, is a self-care public speaker, continuing education provider and yoga chiropractic therapist based in Alabama. She uses the acronym GPS to illustrate the benefits of self-care for fitness pros: “Self-care boosts our generosity, productivity and self-esteem,” she says. “When we learn to dedicate some weekly time to our self-care, we take care of our four-part body inside: sensorial, spiritual, social and emotional.”

Tight Muscles
Many people recognize that consistently applying self-myofascial release to hydrated muscles is an important part of overall
wellness. But we rarely invest time, energy, effort and money in regular massages to keep our muscles in optimum health.

“At the very least, learning how to roll out our feet and back muscles on a Friday night after a long week of teaching—and again on a Sunday night before a week of teaching—can help us stay energized and help our muscles’ health and wellness so they can keep taking care of us,” says Zoraida Sepulveda, a wellness and health coach based in Puerto Rico. “It’s like a convention, but I’m only taking a single class, so my return on investment for just 1 hour is huge.”

Start a Mini-Convention
Attending a fitness convention can work wonders for keeping us motivated. But we can’t always commit the resources it takes to attend a convention. Nor can we necessarily afford to lose several days of revenue.

Try this inspiring alternative: Stage a mini-conference by taking a new group-movement class from a different person each month. At worst, taking someone else’s class can reassure us that we provide a superior product. More often, however, another instructor’s class gives us the proverbial “shot in our arm” because we glean new ideas for cues, musical approaches, types of interaction, group dynamics and more.

“I have a practice of taking at least one new class per month, and I get at least three new things to do, say and think from each new instructor,” says Claire Powell, who leads laughter yoga for land and water and is based in San Jose, California. “It’s like a convention, but I’m only taking a single class, so my return on investment for just 1 hour is huge.”

Take a Teaching Vacation
A working holiday is an excellent way to recharge our fitness batteries. After all, it can be impractical to call a “timeout” when we feel burned out, because we don’t want to lose work and revenue. But traveling to a vacation destination to teach can give us the experience of a holiday during off-hours, while the sessions we lead showcase our expertise in places like beachfronts, waterfront gazebos and unique pool settings.

Suzelle Snowden, president of Fit Bodies Inc., places fitness professionals at luxury all-inclusive beachfront resorts in exotic destinations. Such a change of pace gives fitness coaches a chance to be “dazzled by the stunning resort settings, luxury all-inclusive accommodations?

7 Flavors of Self-Care
1. Social: Join a Facebook group for fitness pros.
2. Virtual: Watch YouTube videos focusing on meditation and mindfulness.
3. Physical: Use self-myofascial release to massage deep muscle tissue.
4. Educational: Attend a different instructor’s class every month.
5. Recreational: Go on a working vacation to a high-end spa.
6. Relaxational: Create a soothing herbal tea blend.
7. Inspirational: Listen to a thoughtful podcast or TED Talk.

“When we learn to dedicate some weekly time to our self-care, we take care of our four-part body inside: sensorial, spiritual, social and emotional.”

— Janie Watkins

INSPIRATIONAL
“I have a practice of taking at least one new class per month, and I get at least three new things to do, say, and think from each new instructor. It’s like a convention, but I’m only taking a single class, so my return on investment for just 1 hour is huge.”

—Claire Powell

and limitless gourmet fare,” she says. Her hiring contracts often allow for one adult companion and up to two children at family resorts. The fitness community’s response has been so positive that Snowden has two websites (fitbodiesinc.com and fitnessprotravel.com) where instructors can register and secure placements in the Caribbean, Mexico, Central America and the United States.

**Brew Tea for a Quiet Break**

Taking a complete break from all things fitness can give us a physical and emotional reprieve from work. Consider sipping a special blend of loose tea you make only for its rejuvenating properties (I created a caffeine-free blend of oregano, mint, rose petals and fresh ginger pieces just for such occasions). Boiling water, preparing the blend and steeping it become a ritual that helps us slow down and focus on something other than fitness.

Suzanne Hosley, MA, CEO of FIT® Thailand and organizer of the Asia Fitness Conference in Bangkok, stocks her work and home kitchens with ample tea selections. “Stopping for a few moments to brew a fragrant herbal tea is a great break from the everyday stresses of work,” she says. “I try to do nontraditional work things when I prepare and drink tea, like chatting with friends or playing with our growing collection of stray rescue cats. After work I walk 5 kilometers home every day. It is a great opportunity to disconnect—leaving the stresses behind me—and to reconnect to life. I deliberately stop any thoughts that are related to work stress, and I focus on family, friends . . . and stray cats!”

If you stay indoors for your tea break, consider adding relaxing background music to create an instant respite from the world. Add a candle with a scent that encourages you to breathe deeply. If you relax your eyes and gaze at the flame, your parasympathetic response is likely to kick into gear, which may help your body rid itself of accumulated cortisol, a stress hormone.

If you absolutely must do something else while sipping your tea, consider listening to a podcast or TED Talk that motivates you on a grand scale, rather than one that, for example, prescribes new ways to squat and lunge. My favorite inspirational podcasts include Petra Kolber and Ben Greenfield Fitness. When we’re not listening to others, taking a few moments to journal our thoughts can help us feel better (Breines & Chen 2012).

**Caring Applies to Us, Too**

Fitness is such an intensely demanding career that we must take time to figure out the many dimensions of self-care. Whether we’re getting a massage, attending a new class, taking a working vacation or relaxing with herbal tea, practicing self-care can help us stay connected to our craft and shake off the effects of its many stresses.

**REFERENCE**


**LAWRENCE BISCON-TINI, MA,** is a motivational author and speaker with multiple awards, including the Inner IDEA Inspiration Award. He has worked with celebrity clients for decades and regularly mentors fitness professionals in many capacities. His website is findLawrence.com.

**REFERENCE**

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WHAT ARE THE EFFECTS OF WHEY VERSUS PEA PROTEIN AFTER HIGH-INTENSITY FUNCTIONAL TRAINING?
For years, researchers have been comparing the effectiveness of whey versus plant-based protein, yet this is only the second study involving pea protein and resistance training. In particular, there is limited research regarding the effects of different protein sources on body composition, muscular strength and exercise performance following high-intensity functional training. This pilot study aimed to establish a foundation for changing that.

Eight men and seven women took part in the 8-week study, which required participants to abstain from any dietary supplements other than a protein mix the research team provided (120 kilocalories, 24.4 grams whey protein or 110 g pea protein per serving). Subjects consumed one serving of protein before and after workouts and one serving in the morning and evening on nonworkout days. Nutritional intake was self-reported, with little variation. Body composition, muscular strength and thickness, and exercise performance were tested before and after training through bioelectrical impedance analysis, 1-repetition maximum, ultrasound, and a preplanned workout.

Results showed no significant differences between groups supplementing with whey or pea protein for any variables tested, and both groups saw improvement in muscular strength following the program. However, study limitations—such as the small sample size, limited dietary constraint, and no specification of protein intake based on body size—narrow the scope of these results.


DOES BLOOD FLOW RESTRICTION HELP OR HURT MUSCLES DURING EXERCISE?
Blood flow restriction (BFR) is a training practice that limits the supply of oxygen and nutrients to a working muscle. Researchers have found that stimulating BFR during low-load resistance exercise (LLRE) for a prolonged period can achieve muscular cell growth similar to that experienced with high-load RE. Interestingly, rat-model research has shown that these muscular benefits may be achieved from BFR even without exercise, so Nyakayiru and colleagues set out to determine whether the same would be true for humans.

Twenty healthy males ages 23–25 were randomly separated into two groups: 10 performing LLRE with BFR and 10 resting with BFR. To restrict blood flow, participants wore a blood pressure cuff on one leg, with BP incrementally increasing to 200 mm Hg (millimeters of mercury) for both groups. The LLRE group performed 4 sets of leg press and leg extension (1 set of 30 reps, followed by 3 sets of 15 reps) at 20% of estimated 1RM. The resting group underwent two 5-minute periods of BFR, separated by 5 minutes of rest with the cuff deflated.

In the exercise group, LLRE with BFR elicited higher protein synthesis rates than LLRE alone, potentially leading to greater muscle building or better muscle maintenance following exercise. However, BFR in resting individuals did not increase protein synthesis any more than resting alone.


HOW CAN EARLY TIME-RESTRICTED FEEDING HELP MEN WITH PREDIABETES?
Intermittent fasting (IF) refers to alternating periods of eating and fasting. The newest form of IF is early time-restricted feeding (eTRF), where individuals eat only within a 6-hour window that concludes by 3 p.m. Researchers wanted to determine whether the cardiometabolic health benefits associated with IF are due to the accompanied weight loss or to IF itself.

In a crossover design, eight men ages 47–65 with prediabetes participated in both eTRF (approximate meal times: 7 a.m., 10 a.m. and 1 p.m.) and controlled eating (approximate meal times: 7 a.m., 1 p.m. and 7 p.m.), separated by a 7-week “washout” period. Each intervention lasted 5 weeks and included enough caloric intake to maintain participants’ weight. The men ate only what the researchers provided. Each of three daily meals consisted of 33% of daily calories, with little variation. Body composition, muscular strength and exercise performance were tested before and after workouts and one serving in the morning and evening.

With the eTRF intervention, participants experienced improvements in blood pressure, insulin levels and insulin resistance, oxidative stress levels, and β-cell responsiveness (cells responsible for secreting insulin). There was no effect on fasting glucose or cholesterol. These results suggest that IF does have positive implications for prediabetes, prehypertension and cardiometabolic health—indeed, independent of weight loss.


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