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WHAT IS A  
**NUTRITION  
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LAURIE MCCARTNEY, PRESIDENT

## TAKE FIVE

CHECK OUT FIVE OF  
OUR FAVORITE HIGHLIGHTS  
FROM THIS ISSUE!

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Find the facts that matter.

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Help clients focus on the  
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STRESSFUL WORLD  
Help center clients with  
restorative yoga.

# SEASON OF RENEWAL

These have been challenging months, yet you and all our community have answered the call with creative ideas and innovations. Your feedback and helpful suggestions continue to provide valuable solutions. By sharing your guidance and expertise, and by leveraging the latest technologies with your clients, you're making the world a healthier and happier place.

This month's cover story focuses on nutrition, a health and wellness cornerstone. It's also a common point of confusion for your clients, who struggle with a steady stream of fad diets and misinformation. In "What Is a Nutrition Coach?" by Andrea Blair Cirignano (page 36), we reveal insights and strategies that help people achieve their goals—and are all within the nutrition coach's scope of practice.

For the first time in history, there are more people age 64 or older than there are children 5 years and younger. This is a golden opportunity to work with a growing older-adult population. All you need is the right toolkit, so be sure to read "Custom Performance Paths for Older Adults: Program for Ability, Not Age" by NASM Master Instructor Rich Fahmy, MS, NASM-CPT, CES, PES, SFS (page 44). Fahmy helps you gain a keener understanding of progression and regression techniques for each individual's needs, goals and abilities.

In this overwhelming age of information, with so much data coming at you, we want to arm you with the best techniques to decipher key takeaways. Inside our newest CEU Corner, "Anatomy of a Research Paper: How to Read Beyond the Abstract" by Jennifer Klau, PhD (page 24), we break down the jargon and explore two sample studies by outlining which questions were asked, how they were answered, the types of statistical analyses that were done, whom the findings pertain to, etc. Ultimately, you will learn how to separate the clutter from the substance and apply it to your work. Plus, you'll earn some free CEUs.

To be at our best, we all need rest and recovery time. That's why Shelby Lafrinere's "Finding Peace in a Stressful World" (page 67) is so timely. You'll also appreciate "Turn Up the Burn: The NASM OPT™ Model and the Weight Loss Client" by Master Instructor Rick Richey, DHSC, MS (page 50), which highlights the methodology that revolutionized the training industry.

During this season of renewal, please know that our mission is to support you—the industry's personal trainers and group instructors—with tools and knowledge to continue your important work. We value your feedback and welcome you to connect with us. Please share how your skills are making a difference in the world.

Yours in health,

Laurie McCartney  
President – Global Fitness & Wellness Solutions



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# Training Edge [INDUSTRY NEWS, INSIGHTS & TOOLS]

## Avoid Spring (Over)Training

**I**f clients are showing signs of overtraining syndrome, tweaking their workouts may not be the best remedy. According to a Brazilian study published in *BMC Sports Science, Medicine and Rehabilitation*, “Excessive training results from a combination of different triggers, including insufficient caloric intake, excessive physical and concurrent cognitive effort, and poor sleep quality, instead of the traditional theory centered on overtraining” (2019; 11 [21]).

This may come as a big surprise to clients, notes Kinsey Mahaffey, MPH, a Houston-based NASM Master Trainer and Master In-

structor. “They think all the work is done in the gym,” she says. “They don’t realize

how important recovery is, in terms of seeing the results they want.”

Mahaffey adds that the NASM Optimum Performance Training™ model is “so systematic” she has never seen clients develop OTS from an NASM OPT™-based program. Here are a few of her tips to help clients avoid developing OTS as a result of other factors:

### Revisit the PAR-Q regularly.

Think about whether you’ve talked about these topics recently: job demands, amount of sedentary time, repetitive movements, work, hobbies, footwear, health changes and nutrition/diet. Intermittent fasting, for example, can lead to woozy workouts, so clients may need to shift their timing.

### Make note of “first mentions.”

The first time a client comments on something out of the ordinary (e.g., sleeping poorly, feeling sore, being stressed), Mahaffey puts a note in the client’s file. That way, if it becomes a pattern, she has a record of the time-

line, which may help to pinpoint the cause.

**Let workouts counterbalance life.** “If what’s outside the gym becomes higher-intensity, then we write a program that’s lower-intensity—maybe just going back to Phase I for a while,” says Mahaffey. The flip side may be true, too: If clients retire, for instance, they may benefit from a little more mental and physical challenge in their sessions.

**Sneak recovery into the program.** Mahaffey seldom suggests clients take a week off from the gym, but if she does, she still provides homework, such as foam rolling, stretching and proper nutrition. Other times, she simply adapts workouts without clients even noticing.

“Never say, ‘We’re going to take it easy.’ Say, ‘I’m going to challenge you differently today—with balance drills!’ or ‘I’m going to show you a few cool foam-rolling techniques,’”

Mahaffey suggests.

“When you’re working with people who tend to do too much too soon, you have to challenge their inner competitor to get their buy-in.”

Do You Know  
the Signs of  
Overtraining?

SEE PAGE 9!

## FORM FIX-UP WITH MIKE FANTIGRASSI

CAN  
CLIENTS  
GET

# GREAT GLUTES BY SUMMER?



**T**he short answer is no, says NASM Master Instructor Mike Fantigrassi, NASM-CPT and Master Instructor. “As far as achieving *noticeable* results from glute workouts, it typically takes a year to 2 years,” he says. And, as with all types of hypertrophy, results will vary, depending on factors like genetics and age—as well as workouts and nutrition. Building muscle requires an added intake of about 300 calories per day and a minimum of 1 gram of protein per pound of body weight per day.

Fantigrassi recommends using the overhead squat assessment (side view) to check for an arched back, which makes it difficult to activate the glutes. Even after corrective exercise addresses this, it’s important to keep an eye on form to ensure that clients are not enlisting the help of the hamstrings or lower back during glute moves. Some examples:

**Cable kickbacks.** If the back is arching, reduce the weight and decrease range of motion until you feel the glutes working.

**Squats.** Place the barbell *high* on the back, on the traps, to better target the glutes. Rather than keeping the head and chest up, clients should aim to keep the shins and torso parallel (and angled). Also, unless knee problems exist, it’s actually okay for the toes to travel forward past the knees.

**Step-ups.** During the step-up motion, lean forward a little bit (as in a forward lunge) and weight the leg on the step to minimize the work of the back leg during push-off. (Treat the back leg more like a kickstand.) Most important: Control the *descent*, touching down with a *flat* foot (not toe first). This eccentric/negative movement is where the hypertrophy *really* happens!

## Resting Heart Rate:

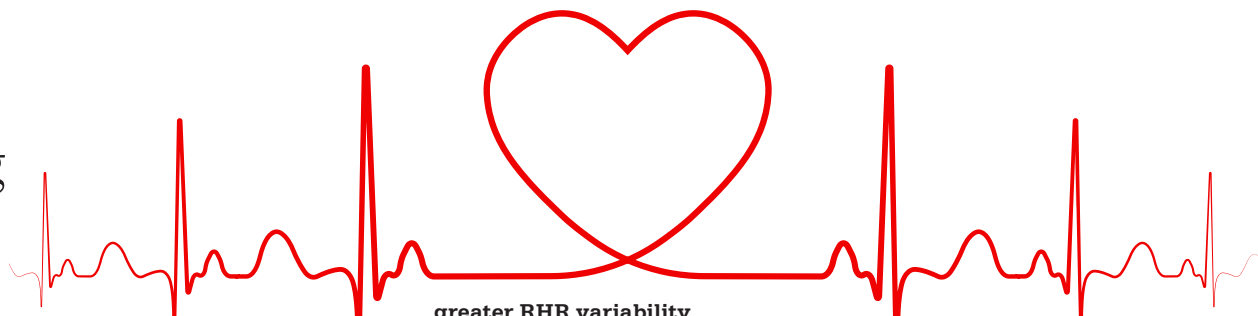
## New Findings on What’s Normal

When using resting heart rate to calculate a client’s target training zone, be sure you know what’s normal for the client in question. A recent article in *PLOS ONE* reported that, among more than 92,000 people whose heart rate data was collected over a 35-

week period, individual RHRs ranged from 40 to 109 beats per minute—a difference of nearly 70 bpm. Further, 20% of participants showed a fluctuation of 10 bpm or more during at least one of those weeks. Also of interest: Women of childbearing age had

greater RHR variability than other adults, and women overall showed more fluctuation than men ([doi.org/10.1371/journal.pone.0227709](https://doi.org/10.1371/journal.pone.0227709)).

The American Heart Association recommends having people take their pulse first thing in the morning, before getting out of bed. Getting at least a few days’ worth of data will make it easier to notice fluctuations.







## Body-Positive Check: Are You Picking the Right Pictures?

Whether you're creating brochures, posters or social media posts, you want to choose images that can inspire your current and potential customers. That may be easier said than done, says Gillian Goerzen, author of *The Elephant in the Gym: Your Body-Positive Guide to Writing Your Own Health and Fitness Story* (Winchelsea Media 2018). "There are not a lot of stock images of diverse bodies," she says. "But it's important to get these images 'right.'"

A recent study in the journal *Body Image* found that even when photos included

disclaimers about retouching, that didn't prevent body dissatisfaction among viewers—in fact, sometimes it made it worse (2020; 32, pp. 34–52).

Here, Goerzen offers some thoughts to keep in mind when making posts or posters for your business:

Consider whether words will do. Often, Goerzen skips the pictures in favor of inspiring quotes or mantras. "Why do we have to have visuals at all?" she asks. "Sometimes a bright background and an intriguing font will capture the same attention!"

**Ditch the "transformation" pics.** While many people use before-and-after imagery to showcase their results, Goerzen says people don't need yet another opportunity to compare themselves against others. If you want to talk about transformations, she suggests focusing on how exercise can generate feel-good hormones or improve health metrics like blood pressure and A1C levels.

**Show what's possible for every body.** "I know a lot of bigger-bodied women who are rocking their fitness!" says Goerzen, who likes to post pictures that *prove* it. Look for photos that present diverse participants doing a wide array of activities.

**Show yourself in "normal" mode.** Goerzen does not want clients to compare themselves with her, so her website shows her in regular (not revealing) workout clothes doing things she loves to do. In fact, many of the pictures show her doing low-key things like tying her running shoe, doing yoga

in the woods or preparing a healthy recipe.

**Get your own photos!** For the picture shown on this page, Goerzen invited photographer Brooke Hewitt-Morgan from Captured Essence photography to accompany her on a 1-day women's body-positivity retreat last summer. At the end of the day, everyone—including some women who had not been in a swimsuit in *decades*—stepped proudly onto the beach together. Not only did the women have an empowering day, but with the appropriate photo releases and permission from the photographer, Goerzen could use the images for future promotions.

Don't have a budget? One way to cut down on costs, notes Goerzen, is to create a reciprocal relationship. For example, help a photographer build a portfolio by offering to model, or invite the photographer to an event where he or she can later sell images to local media or participants. (For a sample release form, visit [nasm.org/docs/default-source/PDF/testimonial-and-photo-release-form.pdf](https://nasm.org/docs/default-source/PDF/testimonial-and-photo-release-form.pdf).)

## Memory Jogger: Do You Know the Signs of Overtraining?

The number-one sign of overtraining—or, at least, the one that's easiest for fitness professionals to spot—is a decrease in exercise performance over the previous 7–10 days. Here are some other things to watch for:

- **decreases** in appetite, body weight, motivation/adherence
- **increases** in blood pressure, irritability, soreness, resting heart rate, sleep problems

## Bring Your “Game Face” TO GROUP EX

Athletes have long been putting on a “game face” to intimidate the competition or just get pumped for an event. It is so effective that a recent study by the University of Tennessee, Knoxville looked at whether it could improve performance on a cognitive task like putting together a puzzle. The resultant article in *Stress and Health* reported that it did—significantly (doi:10.1002/smi.2899).

There are advantages to game face in the fitness world, too. Let clients know you expect them to make faces, noises and mistakes in class. Some ways to ease them into showing a game face:

- **Start with a dramatic breath.**

After a tough segment of the workout, cue the class to do a release breath: Inhale deeply through the nose, then exhale loudly through the mouth.

- **Model it.** Make faces, smile and have an animated expression when you demonstrate a move—and when you walk around the room—so members will mirror you.

- **Compliment their game faces.**

For example, say, “I can tell from your faces that you are pushing hard! Great job!” or, “That’s a great game face! That’s what I want to see!”

As a side benefit to this approach, participants will likely stop holding their breath during the workout. They may also feel more relaxed about other potential embarrassments, like digestive noises or lack of coordination. When the studio becomes a safe place to make faces, noises and mistakes, members will likely notice—and come back for more.



“Recruitment of fitness professionals is a major problem for clubs,” says Derek Weaver, NASM-CPT, AFAA-GFI, and B2B relations manager for NASM and AFAA. “It’s estimated to cost between \$5,000 and \$7,000 in time and advertising to find and hire someone new.”

And the number-one concern of fitness professionals—particularly after earning their certification—is how to secure a good position at a location where they can work and thrive. “We want them to feel, 5 or 10 years down the road, that becoming a fitness professional was the best decision they ever made,” says Weaver.

Enter the software platform ClubConnect, which helps industry professionals develop lasting and meaningful connections.

Since 2014, ClubConnect has been providing online fitness education and workflow solutions for health clubs by partnering with the

biggest names in the industry. Acquired in 2019 by Ascend Learning, whose portfolio includes NASM and AFAA, ClubConnect now offers fitness professionals hundreds of courses, certifications and specialty trainings from more than 18 agencies.

When a club joins the ClubConnect family, its staffers gain access to unlimited CEUs for free. That not only attracts world-class instructors and trainers—it also makes them want to stick around. In fact, a report from *Forbes* found that 87% of millennials say that career development is an important consideration in a job. Unlimited continuing education speaks to this perfectly.

“I see it as an employment benefit,” says Weaver. “You’re providing training that helps fitness professionals do better, and if they do better, they’ll stay longer. By solving for retention, you also solve for recruitment.”

## THE EFFECTS OF EXERCISE ON

Until recently, most of the evidence related to risk reduction for prostate cancer involved maintaining a healthy weight. But recently, based on a U.K. study of 140,000 men, the *International Journal of Epidemiology* reported that those with a genetic

predisposition to physical activity (of all types, not just programmed exercise) were 51% less likely to develop this particular form of cancer.

“This is great news,” says Andrea Leonard, a 36-year cancer survivor and founder of the Cancer

Exercise Training Institute. “However, there is so much evidence *already* to support the need for exercise prior to and during treatment, during recovery, and as part of long-term survivorship. It honestly helps at every stage of the game.”



# Solve the “Revolving Door of Beginners” With Digital Machines

“The fitness industry started out focused on bodybuilders,” says John Ford, North American CEO of EGym, an international manufacturer of advanced, smart-connected strength training equipment. “Gyms have essentially had the same equipment since the days of Arnold Schwarzenegger, even though the customer has changed dramatically [over the years].”

This, says Ford, is one reason for the “revolving door

of beginners.” Too often, new members who do *not* choose a personal training package quickly realize they don’t know what to do, so they don’t get results—and, soon, they’re gone. “We’d love to see the gym industry make an impact on the health and obesity crisis in America,” Ford says. “But first we have to make the gym work for everyone, including the beginners.”

What many people are comfortable with today is *technology*. By introducing



gym equipment that includes gamified programming, data collection and analysis, and high-tech safety features, says

Ford, gyms can make it easier for beginners to get started and keep going, even if they don’t sign up with a personal trainer at first.

Interestingly, he notes, gyms that have brought in self-guided beginner-circuit equipment have experienced a substantial *increase* in personal trainer use.

One tip he offers for clubs in the market for new digital equipment: Ask prospective suppliers about compatibility with other companies’ software, hardware, apps and devices. This way, you can begin to plan for possible add-ons in the months and years to come.



## PROSTATE CANCER

The problem, says Leonard, is that most trainers don’t realize the safety and liability issues related to working with people who have cancer. “For example, if a client with prostate cancer had a retropubic prostatectomy, they will probably be

forward-flexed at the hip and unable (or afraid) to stand erect, so you must have them perform exercises that will correct their posture prior to having them perform any ‘crunch-type’ exercises,” she says.

To educate trainers on how to safely, effectively

and confidently create exercise programming for people with *any* type of cancer, CETI offers the Cancer Exercise Specialist Advanced Qualification program (details at [thecancerspecialist.com](http://thecancerspecialist.com)).

LAURA QUAGLIO has been a writer for the National Academy of Sports



Medicine since 2013. Her favorite physical activity formats include karate, vinyasa flow yoga and every type of group exercise class.

# A BASEBALL TRAINING PROGRAM THAT COVERS ALL THE BASES

Whether they're weekend pinch hitters, Little League legends or players bound for the National Baseball Hall of Fame, baseball athletes can benefit from a periodized program.

BY MARTY MILLER

Baseball players face year-round conditioning challenges—but this year more than ever. At the highest levels, professional baseball players would normally spend approximately 10 months of the year either preparing for or playing their season. Highly competitive youth baseball athletes could match this rigorous timeline, while other youth teams may have seasons lasting anywhere from 4 to 8 months (see “Let’s ‘Strike Out’ Youth Injuries,” page 15). Today, however, the challenges of safely maintaining or restarting a training program are greater than ever, especially given the many people do not fully understand the physical demands of the sport. This article can help trainers focus on what to do next.

To keep athletes on the field as much as possible when seasons begin again, fitness professionals can help by systematically transitioning them through multiple phases of training throughout the rest of the year. This can improve players’ performance on the field, facilitate their recovery off the field and reduce their risk of injuries associated with the sport.

Read on to learn more about the physical impact of this all-American sport—and get some ground rules for trainers who work with its players.

## How Baseball Affects the Kinetic Chain

Baseball is a dynamic sport that places great stress throughout the kinetic chain. Though specific demands vary slightly depending on the positions played, there

are many shared stressors faced by everyone on the team.

For instance, baseball players are rotational athletes, the majority being one-sided rotational athletes. Even the very small percentage of baseball players who can swing a bat effectively from both sides of the plate (i.e., switch-hitters) typically throw with only one arm. Core-oblique injuries are common among baseball players, due to the rapid acceleration involved in swinging a bat.

Repetitive throwing is another type of motion that causes extreme stress on the body, specifically the shoulder and elbow complex. Injuries to the lower extremities—such as strains to the hamstrings, groin or quads—are also common; these are caused by the rapid acceleration required to run the bases or field a ball. And, while less

## A Few Hard-Hitting Baseball Statistics

These numbers won't help you pick a world series champion—but they may provide some perspective on the physical demands placed on baseball players.

**4.3–4.4**  
seconds

sprint time from home plate to first base

preventable, collision injuries can occur when players run into one another or hit the ground as they dive for a ball or slide into a base.

The good news is that, if an athlete is well-educated on how to get in shape prior to game play—and knows how to train (think SAQ), communicate and engage in self-care during the season—the likelihood of such injuries decreases dramatically.

## Putting the NASM OPT™ Model in Play

Generally speaking, a conditioning program for a baseball player—regardless of age or skill level—should progress through the NASM





Optimum Performance Training™ model (below). Specifically, the program should focus on establishing sound biomechanics and structural integrity in the stabilizing muscles of the core, scapula and shoulder and should include appropriate exercises to ensure proper mobility in the hip and

#### THE NASM OPT™ MODEL



shoulder. The program will ideally begin during preseason training and continue throughout the year, being adapted as needed to optimize performance and aid in recovery, but it's the progression that's important here, if the athlete has been unable to train.

Here's one way to look at the three distinct phases of training employed with baseball athletes:

**PHASE 1.** Establish proper human movement in the Stabilization Endurance phase of training.

**PHASE 2.** Establish proper human movement *under load* in the Strength Endurance phase of training.

**PHASE 3.** Establish proper human movement *at high speeds* in the Power phase of training.

Players will benefit from regular assessments of their performance both on and off the field. Assessments can identify muscle imbalances, making it possible to start a corrective exercise program before they become too problematic.

#### STABILIZATION ENDURANCE TRAINING

The first phase of training that a baseball player should undertake is a Stabilization Endurance program. The goal of this phase is to establish (or reestablish) proper movement

patterns, neuromuscular efficiency and muscular endurance for the muscles that maintain ideal joint positions. For baseball players, this is important especially as it applies to core, scapular and shoulder stabilization and rotator cuff endurance.

Many of the upper-extremity injuries associated with the throwing motion can be directly linked to athletes not being able to stabilize their core and scapula. Contributing factors include diminished range of motion with internal rotation of the throwing shoulder, as well as issues with hip mobility. For all baseball athletes, it is essential to address these problems before training demands increase and/or prior to the competitive season.

### STRENGTH ENDURANCE TRAINING

Following the Stabilization Endurance phase of training, the athlete should progress to the Strength Endurance phase. Building off the foundation created in Phase 1, this second phase allows for advancements in overall strength and develops the ability to apply strength

for prolonged periods of time. Training should include supersets, particularly for the shoulders, back, chest and legs (biceps and triceps are optional).

### POWER TRAINING

After the Strength Endurance phase is complete, the athlete can progress to the Power phase of training. The goal here is to establish explosive power so the athlete can generate more bat speed, more explosive speed while running, and more upper-extremity explosive power for throwing the baseball farther and/or faster.

A key point to remember is that the act of practicing or playing the game of baseball creates a high volume of explosive power-based movements. This is why the NASM Performance Enhancement Specialist curriculum recommends that off-the-field “power-training days” be reserved for January and February, before coaches ramp up time on the field. During baseball season itself, the goal should be to maintain power, so a plyometrics exercise or two can be integrated into Phase 1 or Phase 2 training during those weeks.



### CORRECTIVE EXERCISE TRAINING

During in-season training, the program should include corrective exercises to address any impaired movement patterns that surface during game play or practice. Teaching baseball players a self-care program that includes proper soft-tissue work with foam rollers or other self-massage implements will go a long way toward

## Sample In-Season Training Programs: Phases 1 and 2

From April through September, the NASM In-Season OPT™ Baseball Plan is about “Developing a systematic in-season maintenance plan that allows the athlete to minimize decreases in performance and chance of injury over a long season with repetitive sport movement patterns (hitting and throwing)” (NASM 2019).

The overall recommendation is to rotate among stabilization endurance, strength endurance and corrective exercise training, plus recovery days. Note that players may also have a game most days/ nights of the week, and the plan will need to be adjusted based on travel requirements, activity level in a particular game, new or tweaked injuries, and other variables.

*Not all moves are pictured.*

### SAMPLE WEEKLY SCHEDULE

Monday: strength endurance  
Tuesday: off  
Wednesday: corrective exercise  
Thursday: off  
Friday: stabilization endurance  
Saturday: corrective exercise  
Sunday: off

### DAILY PROGRAMMING

The programming for both Phase 1 and Phase 2 workouts should include a warmup, static stretching and a cooldown, as well as core, balance, SAQ and resistance exercises. Suggestions for resistance moves for both phases are offered below.

### SAMPLE DAY: PHASE 1: STABILIZATION ENDURANCE

For each exercise, have the athlete complete 2 sets of 15 reps at a 4/2/1 tempo at 65% intensity with no rest between sets.

**total body:** cable squat to row  
**chest:** suspension pushup (feet in straps)  
**back:** single-leg bent-over dumbbell cobra  
**shoulders:** single-leg cable lift  
**legs:** step-up to balance (frontal plane)

### SAMPLE DAY: PHASE 2: STRENGTH ENDURANCE

For each exercise, have the athlete complete 10 reps at 75% intensity with no rest between sets. Repeat each superset 2 times.

**chest superset:** 1. incline dumbbell press / 2. cable chest press  
**back superset:** 1. seated cable row / 2. single-leg straight-arm pulldown  
**shoulders superset:** 1. seated dumbbell scaption / 2. single-leg cable lift  
**legs superset:** 1. lunge (frontal plane) / 2. single-leg squat touchdown



**PUSHUP WITH FEET IN STRAPS**



# Let's "Strike Out" Youth Injuries

Even though leading medical experts in the field of sports medicine have vocally stated that youth athletes should not focus on just one sport, there has been an increasing push for sports specialization among a large percentage of youth athletes. It comes as little surprise that injuries in youth baseball have risen dramatically alongside this trend.

The results of this can be seen in the youth statistics for a surgical procedure that is common among Major League Baseball players. Called "Tommy John" surgery, it involves reconstruction of the ulnar collateral ligament. The number of young athletes (ages 15–19) having this surgery has risen by more than 50% since it was first performed in 1974 (Cleveland Clinic Newsroom 2019).

As with adult players, young baseball athletes can benefit from a periodized training program that follows the NASM Optimum Performance Training™ model and integrates special exercises and tips from the NASM Performance Enhancement Specialist curriculum. The PES includes an entire section of programming for offseason, preseason and in-season training, making it the perfect adjunct to the NASM Youth Exercise Specialist. Learn more about both programs at [nasm.org/continuing-education/fitness-specializations](http://nasm.org/continuing-education/fitness-specializations).

keeping them healthy throughout the baseball season. Training should also include an appropriate flexibility program that emphasizes stretches of the posterior shoulder capsule, lats, pecs and hip flexors.

## Get Ready to Hit a Home Run (With Clients)

The purpose of a well-devised training program is to help athletes achieve higher

levels of performance while decreasing the number of soft-tissue injuries caused by the physical demands that baseball places on the kinetic chain. The better your athletes are conditioned, the better they may be able to handle the stress on the body, allowing them to keep their eye on the ball and their head in the game.

**Editor's note:** The NASM Performance Enhancement Specialization offers complete

sample training programs for baseball, basketball, football, golf, hockey and soccer, as well as comprehensive guidelines for improving athletic performance in *any* sport or fitness endeavor. Learn more at [nasm.org/pes](http://nasm.org/pes).



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CHEST PRESS



FRONTAL PLANE STEP-UP TO BALANCE



FRONTAL PLANE LUNGE



SINGLE-LEG SQUAT TOUCHDOWN



# ADAPTING ONE-ON-ONE CONTENT TO A GROUP SETTING

Transfer ideas from personal training education to the classroom.

BY KYMBERLY WILLIAMS-EVANS, MA

Personal trainers have so many great ideas to choose from when training their one-on-one clients, but you teach group fitness—can you use those same ideas? Maybe you recently attended an inspiring fitness event that offered amazing programming ideas or just read an article or watched a video that included novel moves you'd like to implement, but the source focused on client-trainer workouts.

Whatever the case, even if you were not the intended target, you can still take advantage of one-on-one content. All you need are a few adaptations and some creativity, and you can bring personal training ideas and moves into the group fitness room.

## Limiting Factors and Possible Solutions

First, let's look at some of the obstacles involved in implementing one-on-one workouts in a group setting, along with viable class conversions.

### LIMITING FACTOR: INSUFFICIENT OR IMPRACTICAL SETUP

Presenters and online tutorials often incorporate resistance tubing into programming, and typically the trainer anchors the tube to a wall hook for the client. Few classrooms have hooks installed on the walls, especially in the numbers or locations needed for multiple people to get a well-rounded workout. For example, you're probably not going to find hooks high enough for triceps kickbacks or at chest height for rows, along with space for participants to step

back to reduce slack. Tubing is perfect for a group class and is an effective, popular and inexpensive piece of equipment. However, moves like the two examples here require the tubing to be secured farther away than self-anchoring allows. Also, the anchor must be strong enough to withstand the exerciser's pushing and pulling. Rather than abandon resistance tubing moves, try one (or both!) of the following solutions:

**PARTNER UP.** Pair participants with someone similar in height and/or fitness level. Partner 1 acts as the "hook," holding the tubing in place, while Partner 2 holds the handles and performs the move, stepping far enough away from Partner 1 to create the appropriate tension. Partners should then switch places. You must know your group and be confident that each person can safely withstand the resistance that



the working person provides. *One caveat: If you work with frail, arthritic, high-risk or low-experience groups, partnering is not a safe option.*

**USE BALLET BARS, IF AVAILABLE.** Some group fitness rooms have permanent ballet bars anchored to a wall (portable bars will not work). Wrap the tubes around the bars, spacing class members appropriately. While you can't change the bars' height to the proper line of pull, you can change the position of the exercisers. Have participants kneel on the floor for triceps kickbacks. Ask taller people to squat or lunge for

## Sample 'Limited Equipment' Drill

You have 10 stability balls, plenty of dumbbells, some innovative personal training exercises you learned at a recent conference, and about 20 participants. What do you do? Break the class into two teams and put the balls on one side of the room, the free weights on the other. Teach the following moves and switch out teams after several exercises in a row.

### Team 1: Stability Ball

Rotate through the following exercises, then switch sides.

- Pike on the ball, 12x.
- Sit on the ball and "write" your full name in cursive.
- Start by sitting on the ball. Do reverse squats, rising only high enough to maintain some contact with ball, 12x.

### Team 2: Dumbbells

- Lunge and biceps curl, 12x.
- Bridge and chest press, 12x.
- Squat while weaving a dumbbell around the legs in a figure-eight pattern, transferring weight from your left hand to your right. Reverse direction.

alternating rows and have shorter people stand tall so the anchor point is in the same plane as the working muscles.

### LIMITING FACTOR: NOT ENOUGH EQUIPMENT

Trainers need just one of a given piece of equipment to meet a client's needs. You may have 20 people in your class and more than 100 dumbbells of different weights,

but only a few stability balls, yoga blocks, gliders or Pilates rings. Week after week, your only options may seem to be dumbbells and body-weight drills. But let's say you want to offer moves using stability balls, even though your club has fewer than 20 of them and several are on the floor, being used by trainers and clients. Again, you have a few simple options:

**PARTNER UP.** As long as you can round up at least 10 balls, partner people up and alternate. Partner 1 uses the ball, while Partner 2 does a free-weight exercise or simply waits her turn. Avoid groups of three because either members will have to wait too long for their turns or the setup will get messy. For instance, if Partner 1 is on the ball, Partner 2 is using free weights and Partner 3 is waiting for a turn, inevitably, when they rotate, they'll get confused or distracted.

**CREATE A CIRCUIT.** If you have fewer than 10 balls for 20 people, set up a circuit. Maybe you also have five steps, four weighted balls, a ton of free weights and four bands. Do the math, assess your space, and set up five stations with four people and four pieces of equipment at each station.

**FORM TEAMS AND TAKE TURNS.** If you have at least 10 units of the equipment you want, but not 20, break the class into two teams. Set up 10 stability balls on one side of the room and free weights on the other. For efficiency's sake, switch out teams after several exercises in a row, instead of sooner. Have Team 1 do three

or four exercises with balls, while Team 2 does the same with free weights, and then switch (see the sidebar "Sample 'Limited Equipment' Drill" for more).

### Limiting Factor: Gathering Accurate Feedback

One benefit of working with a dedicated trainer is that a client can get specific, immediate, relevant feedback that can then be used to adjust the workout in real time. Trainers consistently check in with their clients and ask questions such as "How does this intensity feel?" or "Compared with last week, how is your energy level today?"

Open-ended questions like these provide the information needed to adjust the workout appropriately. However, can you imagine the cacophony and audial chaos if you were to ask such questions of a group? "What kind of music do you like?" or "Let me know how you're feeling." Not only

If you have fewer than 10 balls for 20 people, set up a circuit. Maybe you also have five steps, four weighted balls, a ton of free weights and four bands.





would you have a barrage of responses, but you'd be unable to decipher the individual replies. Instead, try the following approaches:

**ASK FOR HAND RAISES/VOTES TO CLOSED-ENDED QUESTIONS.** Say, "Put your hand up if this intensity/progression/complexity (whatever you want to establish) is just right/too much/too little" or "Hands up if your energy seems higher/lower/the same today compared with last week." Craft questions that require a yes or no vote. While you can't meet each individual's need, you can go with the majority or offer alternatives based on the responses: "If your hand went up for yes, then do option A; if you voted no, then option B is for you."

**WALK THE ROOM AND OFFER PERSONALIZED ATTENTION.** If the format lends itself well

to this, take a break from the front of the room and walk around to give people personalized attention. Help someone with his form; stand next to a participant who is modeling a modification and cue others to follow that person's lead; or if you suspect that someone is struggling or needs a change, sidle up to her and quietly ask a question.

### Limiting Factor: Not Enough Space

Some moves require a lot of space to execute. We've all seen clients traversing the gym floor doing lunges, sled pulls or ladder drills. One person might be maneuvering through machines, halls or openings on the gym floor. How do you fit "big space" moves into a group setting?

**SAVE BIG MOVES FOR DAYS WITH SMALL ATTENDANCE.** Sometimes you simply have to forget creative solutions and save traveling moves for when attendance is low. Everyone has days when few people show up for a class. Whatever the reason (e.g., a holiday, traffic delays or a storm), take advantage of the lower numbers to bring those "big space" moves into the classroom.

**TAKE YOUR CLASS OUTSIDE.** If the weather permits and your facility is located near a wide-open space, consider doing a drill outside. Check with management to ensure this is in line with policy.

While these adaptations can be simple and easy, they are not always obvious. If you see trainers doing cool things with their clients, think a bit "inside the box" of your classroom to bring even more to your group members.

## Get Ready for Greatness at Optima 2020

Speaking of getting the best ideas from the best brains in the fitness business, set your sights on Optima 2020. As an NASM/AFAA fitness professional, you are dedicated to helping others live their lives to the fullest, but don't forget about yourself and your own goals. Set aside a weekend this fall for the ultimate fitness education experience to boost your personal and professional growth to new levels. The NASM and AFAA Optima 2020 Conference is celebrating 6 years of providing the best education to help you help your community thrive. For more information, visit [nasmOptima.com](http://nasmOptima.com).



**KYMBERLY WILLIAMS-EVANS, PHD (ABD),** has taught group fitness on land, at sea and across the airwaves for four decades, in four languages and over four continents.



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# OWN THE BUSINESS OF GROUP FITNESS: UTILIZING DATA TO WIN BIG

Your members, instructors and club owners have unique needs. Keep this trifecta happy by understanding the metrics of group exercise participation.

BY KATE REZABEK, MED

Making your bottom line a top priority is more important than ever in today's competitive fitness landscape. As clubs, studios and boutiques strive to recover from the effects of COVID-19, you will really need to own the business side of group fitness to stay relevant and in the game. And when it comes to leading a winning group fitness program, understanding the metrics that drive success—and how to use them to build value in your program—is key. In fact, it's the first step in running your department like a business (Rezabek 2018).

The thing is, our members, our instructors and our company owners all have pressing needs: The people in each category play a critical role in our business success, and we ultimately want to do our best for all of them. The good news? When you have a strong grasp on what the numbers show—from club traffic to cost per head—you can make decisions that effectively support all these key players. You'll provide the programming that matters most to the members; you'll be a better coach and manager (a true leader who's driving value, participation, retention, culture, engagement and more); and you'll be able to produce measurable, trackable and growth-focused results for the company.

Here, let's unpack the key performance indicators (KPIs) that every group fitness manager should track—because, when you run your department and the technology that supports it like a well-oiled machine, the data won't lie, and you'll all win big.

## 1. Club Traffic

Once things settle back into a normal groove, knowing how many people are entering your business on a daily basis is critical. Chances are, your facility already uses a software program to track member check-ins, likely with an app or a key tag to identify who's coming in the door.

It's important to understand how many people are in your location and when they're arriving so you can explore trends and patterns. Are there spikes of visitors checking in before the workday starts? Does your traffic pick up midmorning after

**You can probably pinpoint trends with your observations and gut instinct, but with actual data, you can position value for your business, which gives you a solid foundation.**





kids go to school? Does it get busy again in the evenings—and, if so, at what time?

You can probably pinpoint these trends with your observations and gut instinct, but with actual data, you can really position value for your business. This gives you a foundation for delivering on other success metrics in group fitness. For example, you may see patterns that differ on certain days of the week. Knowing your traffic on an hourly, daily, weekly, monthly, quarterly and year-over-year basis is critical to being able to craft a program that grows participation.

**PRO LEADERSHIP TIP.** If you run traffic reports for your club and find there's a certain day of the week or a particular time slot when check-ins drop, then talk to or survey your instructors and members to understand their needs and interests. You may discover areas where you can make small changes to your schedule that will affect class attendance and, ultimately, retention.

## 2. Class Attendance

Class attendance goes hand in hand with club traffic. However, the class metric goes further, showing not only how many people are in the club but what they're doing there.



## Bonus Points:

### Using Data to Grow Your Team

**Data doesn't lie, but interpreting club metrics and then learning from them is not always easy. It's important for group fitness department leaders to help their instructors understand how they can positively influence future results through actions and behaviors the instructors can control.**

**Some tips for leaders to share with staff:**

- **Connect with participants before and after class so you can get to know each other.**
- **Promote class benefits on social media (if permitted by the business).**
- **Personally invite new members to class and help them get set up for success.**
- **Keep music fresh, upbeat and relevant.**
- **Vary exercises and class formats—don't let your classes get stale.**
- **Show options and modifications for all fitness levels.**
- **Be prepared for every class with a plan you can mold and adapt as needed.**
- **Motivate, energize and stay positive each time you teach.**
- **Be genuine, authentic and relatable. In other words, be an inspiration to participants.**

**Adopt these tips, and you'll see your culture and engagement grow, along with class participation. That's good for morale—and good for business!**

With today's uptick in smartphone usage, using technology to input and analyze attendance is easier than ever. More and more club software programs are making it possible for instructors to pop their numbers into an app right after class and then quickly be on their way.

If this is not an investment you have made yet, think about how much time and effort you'll save (and the efficiency you'll drive for your department) when everyone can record key metrics "on the go." Accuracy improves when instructors can input data in real time and you don't have to transfer daily numbers manually from a paper tracking system into a spreadsheet. This reduces copying and calculation errors and saves you time for more value-added tasks, like engaging with participants and coaching your team.

**PRO LEADERSHIP TIP.** Be mindful of making quick decisions based on these numbers. When you notice attendance is down in certain time slots, don't immediately pull a class off the schedule. Work with your instructors to craft a plan based on variables they can control, such as intensity or type of music. (See "Bonus Points: Using Data to Grow Your Team," above, for specific ideas.) Keep in mind that new classes and instructors need time to establish themselves, while more seasoned ones may need a refresher. For sustained results, pay attention to data and behavioral trends *over time*.

## 3. Percentage of Group Fitness Participation

This metric builds on the "class attendance" one, showing you how many of the people who come to your facility are taking group fitness classes. Some larger clubs offer a lot of amenities beyond group fitness—aquatics, free weights, machines, racquetball, saunas and more. So keep in mind that, in some scenarios, your members have a lot of options to choose from each day, which may influence this metric.

If you're tracking club check-ins and class attendance digitally, most software programs will automatically calculate this statistic for you. If you need to do the math yourself, it's simple: Take the number of people who attend your classes in a set time period, divide this figure by the number of people who checked into your club during that same time, and then multiply by 100 to see the percentage of your total members who are group exercise participants.

You can dig down as far as hourly on this metric to see how your classes perform at both peak and off-peak times of day. Whether you're looking at year-over-year trends, monthly percentages or hourly penetration by time slot, this is a powerful indicator for class value and performance.

**PRO LEADERSHIP TIP.** Once you know your facility's baseline (current group exercise participation)—and how this percentage varies by the hour, day, month and year—you can make more intentional changes.

For example, you might implement new marketing efforts or retention programs to attract more people into specific time slots and classes.

#### 4. Cost per Head

Cost per head (CPH) measures how much you're spending on payroll per participant, and it's a simple formula: Take the dollar amount you're paying your instructor to teach a particular class, and then divide that by the number of participants in the class. Determining CPH for each time slot—ideally on a month-over-month and year-over-year basis—can really help you identify which classes are performing well and where you need to make changes.

Depending on the size of your studio, CPH can vary greatly. Larger studios can

**We all want to do our best for members, instructors and the business itself. Using metrics to determine where to make changes is a great way to objectively position your team for success.**

hold more people, so you can significantly lower your CPH and payroll costs by bringing more participants into fewer classes. On the other hand, the more your instructor gets paid per class, the higher the CPH will rise. That said, compensating your instructors with a competitive rate, especially if they're a real value-add to your team and your program, will help you attract and retain top talent, a huge

benefit to driving class participation and bringing new members into your clubs.

**PRO LEADERSHIP TIP.** Do your research to understand what instructors are making in your local area. If your compensation is competitive and you hire great talent, your membership and participation will grow, while your cost per head will stay in a profitable range.

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For more information, visit [nasm.org/continuing-education/business-accelerator](http://nasm.org/continuing-education/business-accelerator).



### It All Adds Up: Manage the Data Strategically

Walking a fine line between the people we serve and the data we track takes some skill. We all want to do our best for our trifecta of members, instructors and business owners, and using metrics to determine where to make changes is a great way to objectively position your team for success. Being fair, honest, open and objective when it comes to results will always lead you to do the right thing, especially for your team and your members.

Tracking metrics, analyzing trends and making decisions that incorporate quantitative and qualitative results will also help your department become more profitable than ever. When you position value in your program by growing the KPIs that drive membership, retention and more, you'll win big, and your club will, too.



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**BY JENNIFER KLAU, PHD**

**Yes, exercise science  
literature can be  
difficult to parse,**

**but there are plenty  
of reasons to give  
it a shot. Here's how  
to cut through the  
jargon and find the  
facts that matter to you  
and your clients.**

**P**ublished research can sound as though it's written in a different language. If you can't understand the title of a paper, you may think it won't get any better if you read on. As a result, many people never read beyond the abstract, which summarizes the study's methods and findings. You might wonder: *Isn't that enough?* (The title of this piece gives away the answer.)

Experimental studies yield all kinds of interesting results that can help you and

your clients improve performance, health, safety and other metrics. But if you're relying on lay media for your information, you may not be getting the whole story. Not that they get it wrong, per se, but certain aspects of studies may receive more emphasis than the researchers intended, or it may be unclear that the findings applied to a small, specific group of people (say, five male Olympic bobsled athletes).

With a little help, you can learn what to look for so you can better answer questions





# ANATOMY OF A RESEARCH PAPER: HOW TO READ BEYOND THE

# ABSTRACT

from clients about the next sensationalized headline—or dig deeper into a lay media story that you find compelling.

## THE LIFE CYCLE OF A RESEARCH PAPER

When breakthroughs occur, they are typically announced in a scientific journal by the team of researchers who conducted the groundbreaking study. To understand the inner workings of these articles, though, let's rewind to how they all begin.

### A REVIEW OF THE SCIENTIFIC METHOD

Every journal article begins with the **scientific method**—something you probably learned about in middle school. Though this step-by-step approach has been broken down in various ways over the years, the steps are similar across disciplines: Scientists make an observation, which leads to a research question. From this, they form a hypothesis, see what other research exists on the topic and then design an experiment. They assemble the tools and participants,

conduct the experiment, and collect data. Finally, they aggregate and analyze the results and draw conclusions, which they write up as a research paper.

The guiding principles that underlie quality research are also commonly held by the scientific community. These principles call for research to be ethically conducted, be applicable beyond the context of the study (i.e., have **external validity**) and be reproducible by other researchers using the same methodology.



**Studies that find a null result—that is, the intervention or treatment showed no effect—are far less likely to be published. This is referred to as **publication bias**, and it means we may never hear about these studies, since their authors may not bother submitting their papers to journals.**

#### **A PEEK AT THE PEER-REVIEW PROCESS**

Scientists are people, too. They are subject to errors in judgment, can be led astray by biases and may be beguiled by data that is “too good to be true.” To avoid these pitfalls, articles undergo a vetting process, called “peer review,” after they are submitted to a journal for publication.

In a **peer review**, an article is evaluated by scientists in the same field as the study authors. (The process is **blinded**, meaning these experts do not know whose study it is.) The reviewers examine the study for **internal validity**, or how sound the research is (a marker of its quality). They check to see whether the researchers’ data are accurate and reliable, whether appropriate controls and methods of analysis were used, and so on. They then pose questions to the authors, who submit replies and modifications until the reviewers are satisfied. Finally, the reviewers advise the journal editor on

whether the paper should be published.

Interestingly, studies that find a null result—that is, the intervention or treatment showed no effect—are far less likely to be published. This is referred to as **publication bias**, and it means we may never hear about these studies, since their authors may not bother submitting their papers for peer review.

#### **HOW JOURNAL ARTICLES ARE SHARED WITH THE PUBLIC**

Sometimes the results of a research study first appear in an online publication. This enables the researchers to announce their study results as soon as the paper is accepted, rather than waiting for the print edition to be published.

If the journal in question is **open access**, the full article on the study will be available to everyone for free. In subscription-based journals, the full article will be visible only to paid subscribers—at least at first.

Sometimes these journals make the full article available for free after a certain time has passed.

Until then, the research results will be available in the form of an **abstract**. This is a synopsis of the main purpose and findings of the study (about 200–300 words in length). The context and subtleties of the research, the funding behind it, its strengths and limitations, and how it stacks up against previous work can be assessed only by reading the full article.

Many times, a journal article is also presented in the form of a **review paper**. This type of article is written by experts, too, but it is more “user-friendly” for nonscientists because the language is easier to understand. Review papers tend to give a good explanation of the issue at hand and then summarize the various findings of other papers on the topic. A standard review article, however, is subject to **inclusion bias** by the authors (meaning they might only include studies they deem interesting).

To avoid this, researchers typically do what is called a **systematic review**. This type of review avoids personal bias by using objective standards for inclusion and exclusion, defining the search terms used to find studies on databases, and explaining which studies were excluded and why.





(All of this attention to objectivity makes a systematic review the most authoritative type of review study.) The goal is to analyze and synthesize “everything” that is already known about a particular topic. Systematic reviews often include a **meta-analysis**, in which researchers use a statistical model to “translate” their collective data into quantitative results that are easier to understand.

## WHAT TO LOOK AT IN A JOURNAL ARTICLE

Reviewers of journal articles can be very exacting, requiring the authors to justify everything from study design to execution and analysis. The system isn't perfect, but it is a bulwark against misinterpreting or “cherry-picking” data or jumping to conclusions from evidence that isn't present. (See “A Few Words About Statistics,” right, for more about errors.)

Even if a study passes muster, though, that does not mean it will matter to you and your clients. Its relevance will depend on a number of factors.

## WHAT WERE THE QUESTIONS BEING ASKED?

A scientific study can consist of one question or multiple questions. When deciding whether to ask multiple questions, the researchers make sure this will not affect

the **internal validity** (accuracy or trustworthiness) of the research. If the paper is about swimming and you never hit the pool, it may not be of interest to you.

## WHAT POPULATION WAS BEING STUDIED?

A **population** simply refers to all members of a specified group. This may be highly specific (e.g., lifelong recreational athletes over age 65) or more general (e.g., American men and women). It is very important to consider this when attempting to generalize research results. Yes, effects seen in younger men may apply to older women (and vice versa), but we can't be sure. How the findings of a particular study may be applied to others or generalized to the overall population is known as **external validity**.

To confidently say that a study's results apply broadly to “everyone,” the people

studied need to vary in age, sex and ethnicity. Large studies often break out results by **cohort**, with each cohort referring to a group of subjects with a defining characteristic (e.g., age, sex, ethnicity, type of illness). To draw conclusions about a cohort, it must be large enough that the population it represents would likely respond similarly under the same circumstances. Sometimes a subset of a population included in a study is also referred to as a **sample**. (Of course, the people in the study are often called participants, though they may be referred to as patients or subjects, as well.)

It is important to note that recruiting people to participate in research introduces **selection bias**, since those who step forward may differ in important ways from those who won't set foot in a lab or answer a survey. Since we don't test the latter group, we'll never know. (See “Why Are There So

## A FEW WORDS ABOUT STATISTICS

**Statistics** is the science of synthesizing and analyzing data collected under specific conditions. It allows us to account for the uncertainties inherent in a data set and to quantify the relative import of new findings (Hinkle, Wiersma & Jurs 2003).

When research is done correctly, use of statistics allows for careful extrapolation of the results—so we can draw general conclusions for the larger population, while only studying a sample of it. For example, we can assert that exercise is good for us without having to test every human being on the planet.

There are two important types of **statistical error** that every researcher goes to great pains to avoid: type I, or alpha ( $\alpha$ ), errors; and type II, or beta ( $\beta$ ), errors. A **type I ( $\alpha$ )** error is when you think there is an effect or difference, but there is not. A **type II ( $\beta$ )** error is when there is an effect or difference and the researchers dismiss it (perhaps because they were not looking for it).

How can you keep the two straight? In the story of “The Boy Who Cried Wolf,” when the boy falsely cries wolf and everyone comes running, that's type I. When the wolf is really there and no one believes the boy, it's type II.

For researchers to draw conclusions from a study, the results must be **statistically significant**. The threshold for statistical significance in exercise research is typically set at  $\alpha = 0.05$ , meaning we can be reasonably confident that, 95% of the time, the differences found in our analysis actually exist. (The other 5% of the time, they may be due to chance.)

Why don't researchers insist on a higher standard—like 99%? In medical and pharmaceutical trials, they do, because the stakes and costs are higher. However, in exercise research, achieving an  $\alpha = 0.01$  result would be prohibitively expensive, decreasing the number of studies laboratories could perform.

As imperfect as research may be, the answer is to do more of it and allow the highest-quality information to flow to the top. This naturally happens when educational and certifying organizations seek out the best science—and adapt when the consensus changes.

## WHY ARE THERE SO MANY STUDIES ON YOUNG MEN?

It may seem that there is an inordinate amount of exercise research done on young men. That is because there is, for a number of reasons. Many university labs use male undergrads in their research because there is a large, willing supply on hand; they typically have flexible schedules; and young men do not have the hormonal fluctuations that menstruating and pregnant women do. Further, many universities require study participants to be no older than 35; older adults (over the age of 50) are more likely to have preexisting conditions—and thus would require more medical oversight and evaluation during the study.

Until the late 20th century, clinical trials (often led by a medical doctor) also tended to study only males, to avoid complications introduced by the menstrual cycle or the dangers of testing drugs on pregnant women. It is now recognized that women respond to medications differently from men, and scientists agree that differences in sex, age and ethnicity need to be adequately represented among participants in pharmaceutical research (Liu & Dipietro Mager 2016).

Many Studies on Young Men?,” above, for another look at bias.)

### WHAT WAS THE SIZE OF THE SAMPLE BEING STUDIED?

Some studies are very large and look at a diverse group (varying in age, sex, ethnicity). Others involve a small sample of a specific population of interest (e.g., a particular age, sex and/or ethnicity, or with a specific health condition). **Crossover studies** provide a way to increase statistical power while using a smaller sample. For these, experts compare the same people to themselves under multiple circumstances in a random order, with a “washout” period separating the experiments. This cuts the required number of participants by half (or more), while yielding results on several types of interventions.

In any case, to answer a research question, a study must produce results that are **statistically significant**. This affects the number of participants needed to find out if the hypothesis works. Having too many participants makes for an unwieldy and expensive study (though more data), but if there are too few, the results are unlikely to show a statistical difference. (See “A Few Words About Statistics,” page 27, for more on this numbers game.)

### HOW LONG DID THE STUDY LAST?

In some cases, a study will look at interventions over a long period of time. In others, the whole study lasts a few weeks or incorporates only a few lab visits. It's not that one or the other is better, but the time period could affect how it applies to

your clients (or not). Typically, though, large studies that follow many people over a long time, called **prospective research**, give us a lot of very strong data. (See “Types of Studies: Looking Forward or Looking Back,” page 32, for more on this and other types of studies.)

### HOW WAS THE STUDY FUNDED?

All studies have budget restrictions. The cost of supplies, equipment, testing, staff and volunteer payments add up. Typically, funding comes from private or government grants or research foundations, but sometimes it comes from businesses or corporations that produce a particular product. These must be listed at the end of the article as potential conflicts of interests (more on that later).

### HOW WERE THE PARTICIPANTS DIVIDED INTO GROUPS?

You may have seen the words *controlled*, *randomized*, *single-blind* and *double-blind* in study abstracts. Here are some quick ways to remember what this jargon means.

In a **controlled** study, only some of the participants receive the treatment or intervention—for example, in a medical trial, half might receive a **placebo**, or fake pill. The group not receiving treatment is the **control group**. In a **randomized** study, participants are assigned at random to the experimental or control group. Using randomized controls helps ensure that the results of an experiment are not biased.

Also important is “blinding,” previously mentioned in relation to peer reviews. Within a study, blinding refers to the con-

cealment of information from researchers or participants in an attempt to prevent their personal biases from affecting the results. In a **single-blind** study, only one group of people (the researchers) knows who is getting which treatment; the participants do not. In a **double-blind** study, neither the researchers nor the participants know who is getting what—until after the data are collected. (At that point, the researchers need to know who was in which group so they can analyze the data.) Since researchers' expectations about what works could influence their behavior (and thus that of the volunteers), double-blind research is considered the gold standard.

### WHERE WAS THE STUDY PERFORMED?

**Repeatability**, which refers to the variation in measurements taken by one research team and/or instrument, underlies internal validity, or the inherent accuracy of the test itself. Laboratory research is often considered more reliable than field research because one can exercise greater





control over samples and sampling in the lab than in the field. In the lab, temperature, atmospheric pressure and humidity are maintained so that instruments remain calibrated throughout each testing bout. Samples, be they tissue or bodily fluids, can be tested immediately or processed for long-term storage without delay.

### ARE THE RESULTS SIGNIFICANT AND/OR IMPORTANT?

**Statistical significance** means that the differences found upon analysis are probably real, with a small probability that the effect is merely due to chance. Statistical significance or, in some cases, a *trend* toward significance in the data, is typically necessary for publication. (Also see “A Few Words About Statistics,” page 27.)

However, just because something is statistically significant does not mean the information is meaningful, or vice versa. Whether or not something is “important” is highly subjective. For instance, training differences among the top three medalists

**It is important to note that recruiting people to participate in research introduces selection bias, since those who step forward may differ in important ways from those who won't set foot in a lab or answer a survey. Since we don't test the latter group, we'll never know.**

in an Olympic event is typically not statistically significant, but that margin may be very meaningful to people who want to compete with them.

### ANATOMY OF AN ABSTRACT

Now that you can cut through the jargon—and figure out what is important to you—here is a breakdown of where you'll find key information in a journal abstract and/or article.

As noted earlier, the first thing you'll see when you look up published research is typically the abstract, which summarizes the paper. The abstract is a terrific way for you to quickly evaluate whether a study could be of interest to you or your clients. It includes the following sections (though in some cases, the section names may be missing or may be slightly different):

**OBJECTIVES:** This part of the abstract

explains the research question or questions and, often, what prompted the study.

**METHODS:** This part gives information on the size and specifics of the group studied, the testing methods used, and how outcomes were measured. It often introduces abbreviations that are then used in the rest of the article (e.g., CRP for C-reactive protein). The number of people who were studied is referred to here as *n*. So, if there were 23 people in the study, it will say (*n* = 23).

**RESULTS:** This section gives the outcomes of the statistical analyses of the data collected during the study. It also notes which (if any) showed significance and what that significance was.

**DISCUSSION:** Here's what most of us are really looking for: How can the findings be applied in the real world? Unfortunately, it is this part that many people use, on its own, as evidence for or against whatever



case they are making. However, reading through the paper in its entirety is vital for those who want to truly understand the nuances of the research.

## ANATOMY OF A JOURNAL ARTICLE

In a “complete” published research paper, the sections are similar to those in the abstract, but each goes into much greater depth.

**INTRODUCTION/BACKGROUND:** This is typically an overview of the current literature and the rationale for the study—for example, this section might state what information is missing from the existing research or what existing research the study wishes to try to reproduce. **Reproducibility** is a foundational principle of scientific research: If findings from one study cannot be reproduced under similar conditions, it calls into question the original results.

**MATERIALS AND METHODS:** Here, you’ll find descriptions of how volunteers were selected and allocated to treatments or to a control group (if used), as well as specifics about the interventions (doses, timing, washout period, etc.). This level of detail may seem excessive, but it allows other laboratories to replicate the techniques in a future study.

**RESULTS/OUTCOMES:** This section characterizes the statistical analysis techniques used, including the computer program and version; the sampling techniques, calibration and manufacturer of the machines used in the lab; how the samples were prepared and stored (including test tube type and how long centrifuged); and, sometimes, charts and tables of the main outcomes. You will also find details and explanations for any adverse events, such as how many volunteers dropped out of which group(s) and an explanation for any data excluded from analysis. (*Note:* Excluding data is legitimate if it was problematic or if there were errors in its collection, but it is not okay if the results simply didn’t fit in with what researchers hoped to find.)

**DISCUSSION/CONCLUSIONS:** Here, the study authors share their explanation and synthesis of the findings and make a case for why they are important (and to whom). They also offer suggestions on what, if anything,

to do about the findings. This section may include (or be followed by) a “strengths and limitations” section, also written by the researchers, along with suggestions on what further research should be done. Strengths may include how the findings can be generalized and how consistent the data

## WHAT QUALIFIES AS ETHICAL RESEARCH?

Some of science’s most egregious offenses have occurred in research with vulnerable populations who did not know they were being studied or did not have a choice. That is one reason why, today, a study is not published in a reputable, peer-reviewed journal unless the experiments were approved by an institutional review board, ethical review committee or animal use committee before the work began. These groups look at proposed research and make sure it does not pose undue risks to the participants; it is not relying on populations who might feel pressured to participate (such as students of a research professor or employees of an organization); the compensation offered is commensurate with the risks and inconveniences posed by the study; and those risks and inconveniences are clearly explained to the volunteers in language they can easily understand (i.e., there is informed consent).

Ethical researchers also commit to maintain the anonymity of participants, not to invade their privacy, to give them safe and competent treatment, and to share the results of the study with them (Berg & Latin 2004). Further, all volunteers must be reminded that they can drop out of a study at any time, without penalty; it is unethical for a researcher to suggest otherwise.

Attempts to skirt any of these principles—by conducting research “off-shore,” for example—are condemned by the scientific community.

were; weaknesses may be related to data being incomplete, inaccessible, difficult to understand or difficult to reconcile with existing research.

Usually, there will also be a description of where funding for the study originated and any possible conflicts of interest (for instance, if a study suggests you should eat 12 pounds of cheese daily—and was funded by a dairy lobby group). A conflict doesn’t necessarily mean the study is invalid, but you may want to compare it with other research done by scientists with “neutral” funding sources to see if those researchers drew the same conclusions.

## CASE STUDIES: COMPARING THE ABSTRACT TO THE ARTICLE

Now that you’ve reviewed the terminology and framework of a journal article, let’s explore two actual abstracts from *Frontiers in Physiology*, along with some of the additional things you can learn if you read beyond the abstract.

### CASE ONE: Inflammatory Effects of High and Moderate Intensity Exercise—A Systematic Review

As a systematic review, this study from Cerqueira et al. (2020) combines findings





**In some cases, a study will look at interventions over a long period of time. In others, the whole study lasts a few weeks or incorporates only a few lab visits. Typically, large studies that follow lots of people over a long time, called prospective research, give us a lot of very strong data.**

from a wide array of existing studies. If you were to read only this abstract, you would assume that longer bouts of high-intensity exercise contribute to increased injury risk and chronic inflammation. However, if you read the whole article, your conclusions would be more nuanced and less definitive, as noted below.

*Note:* To access the complete article as you read this example, type “doi: 10.3389/fphys.2019.01550” into the search bar on your web browser.

#### ABSTRACT

**BACKGROUND:** Exercise leads to a robust inflammatory response mainly characterized by the mobilization of leukocytes and an increase in circulating inflammatory mediators produced by immune cells and directly from the active muscle tissue. Both positive and negative effects on immune function and susceptibility to minor illness have been observed following different training protocols. While engaging in

moderate activity may enhance immune function above sedentary levels, excessive amounts of prolonged, high-intensity exercise may impair immune function. Thus, the aim of the present review was to clarify the inflammatory effects in response to different exercise intensities.

**METHODS:** Search was performed on PubMed and was completed on July 31st, 2017. The studies were eligible if they met the predefined inclusion criteria: a) observational or interventional studies, b) conducted in healthy adults (18–65 years), c) written in Portuguese, English or Spanish, d) including moderate and/or intense exercise. Eighteen articles were included. The specific components that were examined included circulating blood levels of cytokines, leukocytes, creatine kinase (CK) and C-reactive protein (CRP). The methodological quality of the included studies was assessed.

**RESULTS:** Most of the intervention studies showed changes in the assessed

biomarkers, although these changes were not consistent. White blood cells (WBC) had an increase immediately after intensive exercise ( $> 64\%$   $\text{VO}_{2\text{max}}$ ), without alteration after moderate exercise (46–64%  $\text{VO}_{2\text{max}}$ ). The results suggested an elevation of the pro-inflammatory cytokines, namely IL-6, followed by an elevation of IL-10 that were more evident after intense exercise bouts. CRP increased both after intense and moderate exercise, with peak increases up to 28 h. CK increased only after intensive and long exercising.

**CONCLUSION:** In summary, intense long exercise can lead, in general, to higher levels of inflammatory mediators, and thus might increase the risk of injury and chronic inflammation. In contrast, moderate exercise or vigorous exercise with appropriate resting periods can achieve maximum benefit.

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#### ARTICLE ASSESSMENT

The full article describes the methods for inclusion, the data analysis and the key inflammatory markers of interest. The

## TYPES OF STUDIES: LOOKING FORWARD OR LOOKING BACK

Some studies apply an intervention now and watch what happens, while others look at data or behaviors that have already occurred. Here is a quick guide to the differences.

Most research projects that we think of as “experiments” are **prospective studies**. That is, they start with a group of subjects (e.g., human volunteers or research animals) and impose some sort of intervention (e.g., treatment or behavior), then observe and record the results. Longer-term prospective studies you may be familiar with include the Framingham Heart Study, the Nurses’ Health Study and NHANES (the National Health and Nutrition Examination Survey). These studies have gathered high-quality data on a number of factors that affect overall health—among them, diet, exercise, genetics, smoking and oral contraceptive use.

**Retrospective studies** start by looking at an outcome—such as contracting a specific disease—and work backward. For example, researchers may try to assess why certain people developed a health condition, while others did not. Retrospective studies often include an odds ratio (OR) or a relative risk (RR) that suggests whether certain factors influence the likelihood of something happening to specific groups (e.g., whether daily exercise reduces the RR of early mortality). It is important to note that ORs and RRs show **correlation**, not **causation**. That is, they do not show that A causes B, only that there is some sort of mutual relationship.

When a series of studies repeatedly show a specific correlation, future research may be done to try to tease out causation. Another thing to keep in mind with retrospective studies: They are more likely than prospective research to involve recall bias, as they ask participants to remember what they did (what they ate or how much they exercised, for example) in the past.

researchers conclude that exercise has “considerable effects on inflammation markers,” and yet the article notes that “the strong variability in study designs, type, duration, and intensity of exercise remain obstacles in the assessment of the measurable effects of exercise on inflammatory markers.” Additionally, the authors say that dehydration may have affected the quantification of markers (making them appear more plentiful due to a decrease in plasma volume).

Regarding variability, the studies reviewed were based on individual sports, such as cycling, resistance training and running, limiting the findings’ application to other types of exercise. Also, the number of bouts of exercise and time spent at it varied, and authors were not able to conduct a meta-analysis—again, because of lack of consistency among the studies.

Moreover, most of the studies had only a small number of participants, who exercised at a single level of intensity. And, since all of the studies used healthy, nonsedentary





participants, the results could not be easily extrapolated to those with chronic illnesses or completely sedentary lifestyles.

There are a number of other limitations, too. None are so concerning that we should simply ignore the conclusions, but they are concerning enough that we should not reject high-intensity exercise because this study seems to indicate that it causes more problems than it solves.

This study is careful to point out that, along with intensity, the specific exercise performed and the muscle contraction type (eccentric versus concentric) were critical components. Improving safety might be as simple as increasing the recovery period between bouts, but until further research is conducted, we don't know.

#### **CASE TWO: Six Sessions of Sprint-Interval Training Did Not Improve Endurance and Neuromuscular Performance in Untrained Men**

This research from Bertschinger, Giboin & Gruber (2020) is of interest because it

**In a double-blind study, neither the researchers nor the participants know who is getting what treatment—until after the data are collected. Since the researchers' expectations about what works could influence their behavior (and thus that of the volunteers), double-blind research is considered the gold standard.**

appears to *undermine* existing findings that short bouts of high-intensity training enhance endurance performance and overall fitness. This type of exercise—also called sprint interval training (SIT) and high-intensity interval training (HIIT)—has become immensely popular in group fitness classes, given its apparent outsized benefits for a relatively small investment of training time.

What is significant about this research article is that it calls into serious question whether at least some of the previous studies were affected by a repeatability flaw, where the instruments or the researchers—not the intervention—were causing the variations. Although the abstract alludes to this, it is explained in greater detail in the main article, which warrants reading.

*Note:* To access the complete article as you read this example, type “doi: 10.3389/fphys.2019.01578” into the search bar on your web browser.

#### **ABSTRACT**

Previous research demonstrated that six sessions of cycling sprint-interval training (SIT) within a duration of only 2 weeks can increase endurance performance considerably. Primarily muscular mechanisms have been under investigation explaining such performance improvements. However, it has been shown in other exercise tasks that training-induced changes also occur at the level of the central nervous system. Therefore, we hypothesized to observe an enhanced neuromuscular performance in conjunction with an increase in endurance performance after 2 weeks of SIT. Therefore, we randomly assigned 19 healthy men ( $26 \pm 5$  years) to a control ( $n = 10$ ) or a training group ( $n = 9$ ), the latter performing a replication of the SIT protocol from Burgomaster et al. Before and after the training intervention, both groups performed a cycling endurance test until exhaustion. Neuromuscular function of the right vastus lateralis muscle was

assessed before and after each endurance task by the means of maximal voluntary isometric contractions (MVCs). The variables of interest being MVC, voluntary activation was measured by peripheral nerve stimulations (VAPNS), by transcranial magnetic stimulation (VATMS), as well as potentiated resting twitches (Qtw,pot). We did not find any significant differences between the groups in the control variable time to exhaustion in the endurance task. In addition, we did not observe any time  $\times$  group interaction effect in any of the

### **INDIVIDUAL DIFFERENCES AND PERSONALIZED TRAINING**

An important principle of exercise physiology, **individual differences**, is (in a way) in direct opposition to the way most research is done. Generally, research studies report the **mean** (average) of various measures. But each human being responds differently to things, including exercise (Bouchard & Rankinen 2001; Pickering & Kiely 2019). This means that even if a particular exercise protocol works well for most people, it may affect a particular individual in quite another way.

As fitness professionals, we already work hard to personalize our approach to clients. Hopefully, as medicine moves toward becoming more personalized and specific to a person's genome, study results will reflect this and better support individualized training plans. It would be remarkable if we were able to know what mode, duration and intensity of exercise each person would respond to *without* engaging in trial and error, but we're not there yet.



**Reproducibility is a foundational principle of scientific research: If findings from one study cannot be reproduced under similar conditions, it calls into question the original results.**

neuromuscular parameters. However, we found a significant large-sized time effect in all neuromuscular variables (MVC,  $\eta_p^2 = 0.181$ ; VATMS,  $\eta_p^2 = 0.250$ ; VAPNS,  $\eta_p^2 = 0.250$ ; Qtw,pot,  $\eta_p^2 = 0.304$ ) as well as time to exhaustion ( $\eta_p^2 = 0.601$ ). In contrast to other studies, we could not show that a short-term SIT is able to increase endurance performance. An unchanged endurance performance after training most likely explains the lack of differences in neuromuscular variables between groups. These findings demonstrate that replication studies are needed to verify results no matter how strong they seem to be. Differences over time for the variables of neuromuscular fatigue irrespective of group (MVC, + 9.3%; VATMS, + 0.2%; VAPNS, + 6.3%; Qtw,pot, + 6.3%) demonstrate test-retest effects that should be taken into consideration in future training studies and emphasize the inevitable necessity for controlled experiments.

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#### ARTICLE ASSESSMENT

Experimental control can be undermined by very basic failures, such as failing to account for the duration of a **learning effect**. Whenever research volunteers are tested—be it to see how long they can exercise to exhaustion or how hard they can voluntarily contract a muscle—they will naturally improve somewhat in their ability to perform the test once they become familiar with what is expected.

There are certainly ways to avoid this error. In this case, the study used a control group that took the same tests as the intervention group. The control group showed the same improvement in neuromuscular function, as one would expect (many early improvements in exercise performance are attributable to this). But the training group was no different in this, nor was there an increase in their “exercise time to exhaustion” (a marker of endurance improvement) over the 2 weeks of their training.

In the full article, Bertschinger, Giboin & Gruber hypothesize that the two exhaustive cycling tests (taken by both the control group and the training group before testing began) may have induced neuromuscular

adaptations that persisted as long as 2 weeks. In other words, their first step in the process may have caused the control group to reap benefits, making them in effect part of the intervention group!

If this study had not used a control group, the researchers might not have realized the problems underlying the previous experiments. They wholeheartedly expected to find improvements in the training group that did not appear in the control group. When they found no differences, they realized that even minor differences in methodology can lead to very different outcomes—and that no matter how strong results appear to be, replication studies are essential. They submit that this is a recognized problem in the sport and exercise science field, particularly in evaluating short-term interventions.

#### LIKE EXERCISE, IT GETS EASIER WITH PRACTICE

As you can see, even for a nonscientist it's useful to peruse the current literature—in its entirety—to see whether the people interpreting it have done a good job. As with anything new, you may feel when you first wade in that you're over your head. (Your new clients probably feel that way, too!) But the more you read scientific journals and learn their jargon, the easier it will be to understand them (at least to a point). While most of us aren't going to be qualified to evaluate the validity of scientific studies (or dismiss them out of hand), we can at least develop a better understanding of their underpinnings, and from there we'll understand more clearly how they might apply to our clients.



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References for this article available online at [blog.nasm.org](http://blog.nasm.org).

### COMMONLY MIXED-UP TERMS

<b>Population:</b>	all members of a specified group, such as all residents of a particular city or state, those in a particular age group, etc.
<b>Cohort:</b>	study subjects with a common defining characteristic, such as age, sex or illness
<b>Sample:</b>	a subset of a population included in a study
<b>Causation:</b>	a relationship between two variables in which one produces a result when applied to the other
<b>Correlation:</b>	a statistical relationship that exists between any two variables and that may or may not imply causation
<b>Internal validity:</b>	how sound the research, methods and analysis of data are; an indicator of quality
<b>External validity:</b>	how a study's findings might be applied or generalized to others
<b>Repeatability:</b>	agreement between tests within the same study; e.g., ensuring that instruments are appropriately calibrated so that differences are due to changes and not errors
<b>Reproducibility:</b>	ability for other researchers to come up with the same or similar findings when using the same methods and approach





# CEU QUIZ: Anatomy of a Research Paper: How to Read Beyond the Abstract

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

1. Define key components of the scientific process and research studies.
2. Differentiate "statistically significant" findings from "important" ones.
3. Explain factors affecting whether or not a study is broadly applicable.
4. Discuss what is gained from reading a full study versus the abstract or a media report.
5. Describe the importance of systematic reviews and how to apply their findings.

### 1. Required qualities of sound scientific research include all of the following except \_\_\_\_\_.

- a. reproducibility
- b. external validity
- c. statistically significant results
- d. approval following an ethical review

### 2. Crossover studies are a way to increase \_\_\_\_\_ by comparing study participants to \_\_\_\_\_.

- a. statistical power, the general population
- b. statistical significance, previous study results
- c. sample size, other participants in the same study
- d. statistical power, themselves

### 3. The use of statistics allows researchers to \_\_\_\_\_ their results, without having to test an entire \_\_\_\_\_.

- a. extrapolate, population
- b. publish, sample
- c. validate, population
- d. extrapolate, sample

### 4. To avoid personal bias, systematic reviews include \_\_\_\_\_.

- a. only the studies the authors agree are important
- b. studies that were selected based on objective characteristics
- c. studies that are all a little bit different from one another
- d. all the studies found on the topic

### 5. Regarding the sex of most study participants, it is recognized that \_\_\_\_\_.

- a. research on young males can be generalized to women and older men
- b. women respond to interventions differently from men, so women should be studied, too
- c. most research is done on young males and males over age 50 with health problems
- d. pregnant women's hormones make them unfit for research studies

### 6. For a study to be considered ethical, it is expected that researchers \_\_\_\_\_.

- a. recruit participants who are their students or employees
- b. pay the participants based on their age and experience
- c. fully disclose the names and data of the participants
- d. remind volunteers that they can drop out without penalty

### 7. Internal validity is determined by \_\_\_\_\_.

- a. the study's overall quality control
- b. the researchers' personal expectations
- c. use of a diverse group of research volunteers
- d. the data being measured by multiple scientists

### 8. External validity refers specifically to the ability to \_\_\_\_\_.

- a. write about the study in the lay media
- b. use the research in another experiment
- c. generalize the findings to other groups or a larger group
- d. generalize the findings within the study group itself

### 9. Statistical significance in exercise studies is typically set at \_\_\_\_\_, meaning there is a \_\_\_\_\_ possibility that results are due to chance.

- a. 0.05, 10%
- b. 0.05, 5%
- c. 0.01, 10%
- d. 0.01, 1%

### 10. The main outcome or findings of a study can be found in the \_\_\_\_\_ section of the abstract.

- a. results
- b. methods
- c. discussion
- d. objectives

### 11. A common drawback of retrospective studies is the likelihood of \_\_\_\_\_ bias.

- a. selection
- b. prospective
- c. ethical
- d. recall

### 12. Correlation shows \_\_\_\_\_ between variables, but that does not necessarily mean there is \_\_\_\_\_.

- a. a relationship, causation
- b. causation, a relationship
- c. probability, causation
- d. repeatability, a relationship

### 13. \_\_\_\_\_ are more "user-friendly" for nonscientists, with \_\_\_\_\_ being the most authoritative.

- a. Double-blind studies, systematic reviews
- b. Review papers, single-blind studies
- c. Peer-reviews, systematic reviews
- d. Review papers, systematic reviews

### 14. According to the information about Case Two, previous research on high-intensity training studies may have serious \_\_\_\_\_ flaws.

- a. repeatability
- b. external validity
- c. population
- d. causation

### 15. In exercise physiology, the principle of \_\_\_\_\_ is in direct \_\_\_\_\_ with/to the way research studies are done.

- a. individual differences, agreement
- b. individual differences, opposition
- c. following one standardized protocol, agreement
- d. peer review, opposition

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



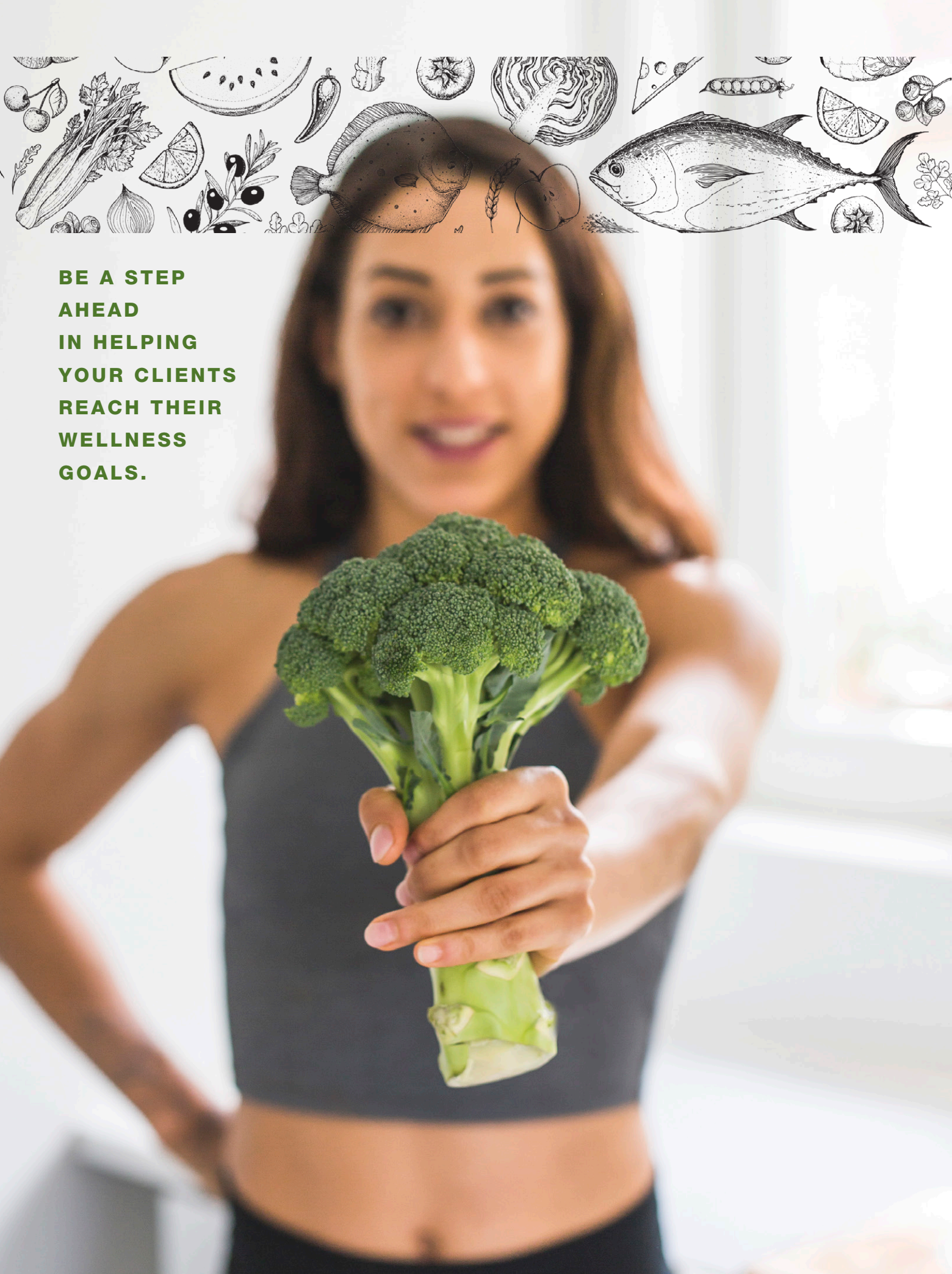
# What IS A Nutrition Coach?

**BY ANDREA BLAIR CIRIGNANO**

Maria wants to lose weight. The 46-year-old mother of two never lost the “baby weight” she gained after having her second child 5 years ago, and the extra 40 pounds is compounding other challenges in her life. She’s overworked, tired and stressed, and her doctor has warned her that she’s teetering on the edge of metabolic syndrome; if she doesn’t do something now to disrupt her negative health trajectory, the consequences could be serious. This new client is desperate, and she’s looking to *you* for answers. How can you help her?

You know the ins and outs of exercise physiology, biomechanics and program design, and you also know it takes more than a sound exercise program to stimulate fat loss. The food and drink a person ingests is a big piece of the puzzle. “As a rule of thumb, weight loss is generally 75% diet and 25% exercise,” according to Shawn M. Talbott, PhD, nutritional biochemist and former director of the University of Utah Nutrition Clinic. “An analysis of more than 700 weight loss studies found that people see the biggest short-term results when they eat smart” (Wexler 2017).





**BE A STEP  
AHEAD  
IN HELPING  
YOUR CLIENTS  
REACH THEIR  
WELLNESS  
GOALS.**

## The Role of Technology

Technology can provide a support system for clients, and when used properly, has been shown to produce results. “We are very fortunate that we live in a world with amazing tools and technology,” says Brad Dieter, PhD, chief operating officer for Macros Inc. and director of science for Harness Biotechnology. “There are countless apps for tracking food, as well as apps for calculating caloric needs.” Your clients likely have a phone on them at all times, so why not encourage them to use it to support their wellness journey?

With the number of apps available today, it's easy to track meals, calories, nutrients and habits. “I would recommend any app that helps you log the food you eat,” says Mark Hedegore, RD, LD, CSCS, owner of Live Fit Personal Training and Nutrition. “People who log what they eat tend to lose more weight and keep it off longer than people who don't, and these apps are also a great tool for keeping yourself accountable to yourself and others, if you wish to share your nutrition logs.” Apps that allow sharing make it easier for you to review client nutrition and habits, while also inspiring your clients to have a healthy relationship with technology.

NASM content development and production manager Brian Sutton, MA, MS, NASM-CPT, CES, PES, CNC, says the technology or gadget choice should fit into the client's lifestyle and budget and be used only as a support tool (not the sole solution) while the client is working toward a health or weight loss goal.

Mike Fantigrassi, MS, NASM-CPT, CNC, Master Instructor and senior director of product development, agrees that apps and trackers can be very beneficial, but he adds: “The only caveat is [to make sure] the client does not become overwhelmed by using these tools.” Sometimes, technology can become a problem and encourage obsessive behavior. “If someone becomes too focused on hitting certain metrics like steps and does not reach that goal, it can make some people stressed and [they can] feel they are not doing enough. Losing weight generally has its ups and downs, and being consistent in the long term is what gets results.”

Whether clients are comfortable with technology or not, “there are very simple mental tools that people can use to help with nutrition,” says Dieter. “Being mindful about eating, paying attention to hunger cues and positive self-talk are also excellent tools.”

How can you, as a personal trainer and health advocate, inspire and support change in clients like Maria? If exercise is essential but not enough on its own, and a multipronged approach is key, then education and awareness are paths to success. To make a real difference, trainers must look at the bigger picture—at a client's fitness, lifestyle and nutrition *as a package*. Client goals extend well beyond weight loss but, even for goals that have nothing to do with the scale, nutrition plays a pivotal role.

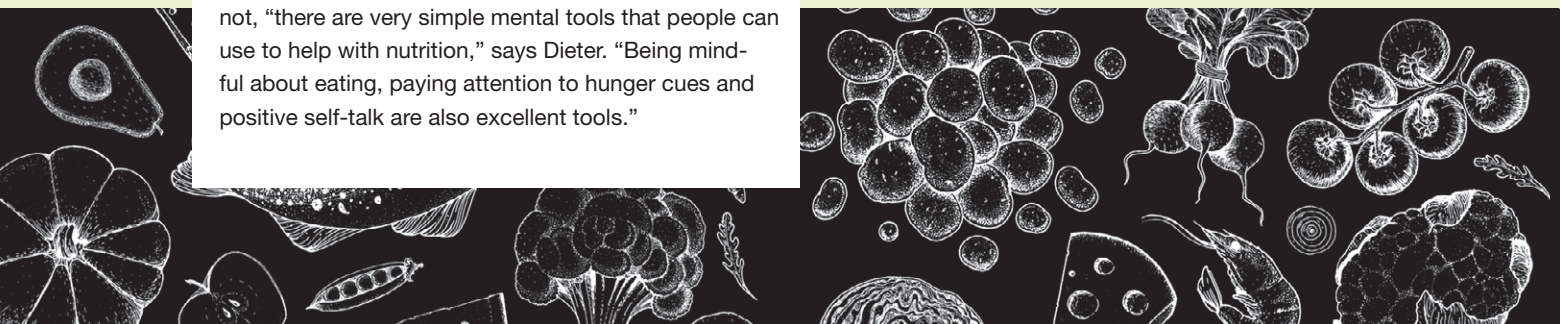
To support positive behavior change that will persist long term, trainers must view their clients' wellness as a larger entity with many moving parts—of which exercise and nutrition are only two (albeit two of the most powerful). “Fitness professionals should focus on helping clients make lasting lifestyle changes,” says NASM content development and production manager Brian Sutton, MS, MA, NASM-CPT, CES, PES, CNC. “After all, achieving health- and fitness-related goals is not a quick fix or a one-time event, but rather a lifelong journey. Fitness professionals can provide their clients with the knowledge and skills needed to make positive behavior changes that last a lifetime.”

## Starting With Scope

For fitness professionals, no discussion about nutrition is complete without mentioning scope of practice. You've heard it before—you can't out-train a bad diet—but how can you assist clients with nutrition without stepping outside your scope of practice? If Maria asks you to plan a diet for her based on her goals, that's a no-no. So, what *can* you do? (See “Nutrition Coach Scope of Practice,” page 40, for more on this.)

Scope of practice includes actions, procedures and processes that a professional is allowed to undertake in keeping with the terms of a particular license or credential, and parameters vary from state to state. Above all, Sutton says, fitness professionals and even nutrition coaches “should not provide services that are reserved for medical professionals. Services such as [offering] nutritional therapy to treat disease, diagnosing or treating eating disorders, or prescribing specific meal plans are out of a fitness professional's scope of practice.”

Although meal plans are off the table, there is still a lot you can do to educate your clients and provide support





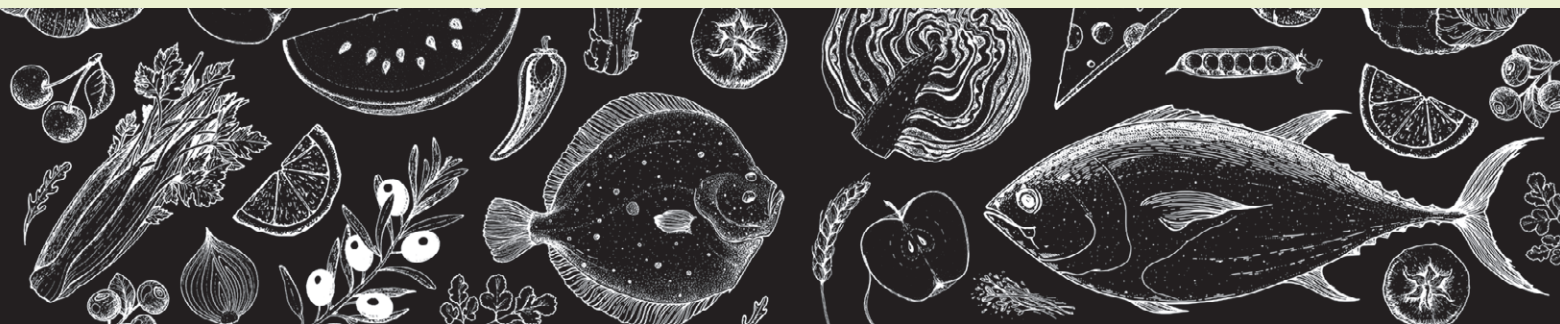


around nutrition, especially if you expand your education in this area. “In most states, [fitness professionals] can provide guidance, discuss supplements and coach clients to make the right choices through education and accountability,” says Mike Fantigrassi, MS, NASM-CPT, CNC, Master Instructor and senior director of product development.

Most of the laws blanket anyone without a registered dietitian title, so enhancing your nutrition knowledge may not drastically change your scope of practice. However, obtaining additional nutrition credentials will upgrade your knowledge and ability to help clients. This is why some trainers, group fitness instructors and other fitness professionals are obtaining a nutrition coaching certificate. It is a good option for anyone who is not on the path to becoming a registered dietitian or a registered dietitian nutritionist, which requires a “bachelor’s

## Helpful Wellness Apps

- NASM Edge (personal training resources, workout routines and tracker, easy trainer-client communication)
- MyFitnessPal (diet tracker with extensive food database)
- Headspace (meditations and mindfulness around eating, exercise and lifestyle challenges)
- Lose It! (simple diet tracker)
- Mealtime app (meal planning) (??)
- Nourishly (mindful eating-based diet tracker)
- Calm (meditation and sleep)





## Nutrition Coach Scope of Practice

Refer to the following when determining what you can and can't do as a nutrition coach.

What an NASM-certified nutrition coach **can** do:

- Calculate caloric needs.
- Teach healthy portion sizes.
- Teach how to read food labels.
- Calculate macronutrient ratios.
- Dispel nutrition myths and fallacies.
- Teach how to navigate grocery stores.
- Discuss the pros and cons of various diets.
- Use coaching and communication techniques.
- Teach the health benefits of various food groups.
- Evaluate eating plans and provide general guidance.
- Perform body composition testing and dietary assessments.

What an NASM-certified nutrition coach **cannot** do:

- Provide exercise prescriptions.
- Promote or provide medication.
- Suggest drastic caloric restriction.
- Diagnose or treat an eating disorder.
- Create or prescribe specific meal plans.
- Conduct psychological counseling or therapy.
- Provide "nutritional therapy" to treat disease.
- Prescribe extreme practices (detoxes, colon cleanses).
- Go against recommendations of a healthcare professional.

Source: NASM n.d.

For more information about the NASM nutrition certification, visit [nasm.org/products/CNC301K](http://nasm.org/products/CNC301K).

degree from an accredited program in nutrition and dietetics, completion of an accredited supervised internship program, [a] passing score on a national registration exam, continuing education [and, in some states,] additional licensing," says registered dietitian Mark Hedegore, RD, LD, owner of Live Fit Personal Training + Nutrition. "In fact," he says, "47 states, as well as several U.S. territories, have laws regulating the practice of dietetics and the use of certain titles such as 'dietitian' and 'nutritionist.'"

While you can't provide nutritional therapy to Maria, you can explain the pros and cons of diets and teach healthy portion sizes. In fact, there's a lot you can do to help people like Maria make sound nutrition choices, and it's all part and parcel of being a certified nutrition coach.



## The Recipe for Being a Nutrition Coach

Since nutrition coaching has fewer barriers to entry than becoming an RD, coaching can be a viable option for many fitness professionals who are looking to advise clients on food choices. "[It] involves using coaching techniques to act as a guide," says Fantigrassi. "There is no one way to eat that is right for everyone. Being a nutrition coach means being a partner in change [who] can provide answers when needed . . . or allowing the client to come to the right decision by asking the right questions."

That's a powerful statement. Examples of good questions you might ask Maria are "How do you typically walk through your grocery store?" and "What's a normal portion size of protein per meal?" The answers to these questions are more than informative; they are foundational.

Personal trainers use a nutrition coaching certificate in the same way they use their personal training credentials—to educate and make suggestions within scope of practice and to guide clients to make their own decisions. Again, nutrition is just a piece of the overall lifestyle puzzle. "To me, being a nutrition coach means that you serve clients in order to help them achieve health, fitness and weight loss goals by using nutrition as a tool to achieve those goals," says Brad Dieter, PhD, chief operating officer for Macros Inc. and director of science for Harness Biotechnology.

"Nutrition coaches work with the general population to facilitate the inclusion of healthy eating behaviors and empower their clients to take responsibility for their own health," says Sutton. "They are mentors and leaders who guide their clients toward a healthier lifestyle. To be a successful nutrition coach, individuals must possess knowledge of both nutritional science and behavior change strategies." It is this knowledge of behavior change that makes personal trainers great candidates to become nutrition coaches.

With a nutrition coaching certification, Sutton says, fitness professionals can take their nutrition expertise to the next level. Practical applications include the ability to "perform dietary assessments and body composition testing; demystify nutrition myths and fallacies; discuss healthy cooking options; provide guidance regarding appropriate calorie consumption for safe weight loss; teach how to read food labels; demonstrate and clarify healthy portion sizes; and provide eating strategies for consuming adequate amounts of lean protein, vegetables, fruits, legumes and dairy to promote health (to name a few)."







## Profile of a Nutrition Coach

### Motivator

- Build strong relationships.
- Leverage nutrition education to increase success, reduce attrition and maximize adherence.

### Nutrition Architect

- Develop customized, evidence-based nutrition guidance for clients.
- Provide actionable, proven methods for clients to reach their nutrition goals.

### Communicator

- Engage in successful interactions with clients.
- Perform consultations and coaching sessions face-to-face and online.

### Authenticator

- Separate nutrition fact from fiction.

### Guide

- Host seminars and events.
- Provide helpful recommendations for clients to navigate real-world nutritional challenges.

### Educator

- Evaluate clients' behaviors and dietary patterns using tools and assessments.
- Provide nutrition education.

### Protector

- Supply safe, comprehensive, empowering and professional nutrition programs.
- Work within scope of practice.

Source: NASM n.d.

## Education and Support

Here's how these strategies come into play: Most mornings, Maria eats a big bowl of granola for breakfast; she believes this is healthy. She doesn't know about reading labels to check portion size or grams of added sugar. Proper education will empower her to make better choices.

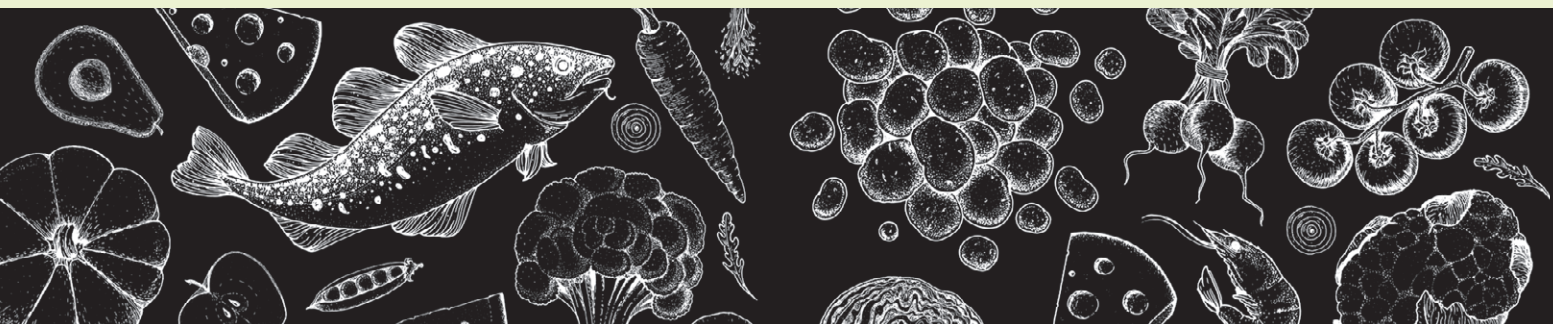
Maria is not unusual. Many clients need nutritional support and advice and, with a little research, it can be clear exactly who can provide that support and advice.

But what are the elements of a solid nutrition program? Ask anyone who isn't selling a particular program, and you'll get some version of the same answer: The right program is the one that will work for your client. Hedegore says the sustainability of a program can make or break a client's results. "Most people [who] go on extreme fad diets gain all the weight back plus a few more pounds," he says. "This yo-yo or roller coaster dieting is also proven to be extremely unhealthy. [It] is proven to increase the risk of metabolic syndrome, diabetes, heart disease and a variety of other unwanted medical conditions." As many trainers know, a list of dangerous health concerns isn't always enough to steer clients away from the allure of a quick fix, so you may have better luck educating them about the poor track records that extreme diets have.

Hedegore notes that "many [diets] are not giving active people the fuel they need to perform at their best and get the most out of their workouts." He says a solid nutrition program will take a client's workout regimen into consideration.

This can work in reverse as well. While it may be appropriate to alter nutrition to accommodate training, it may also be appropriate to adjust workouts to accommodate diet. "You have to know what a client is eating and tailor your training program to that," says Fantigrassi. "For example, if a client comes to you eating a very low-calorie diet, it would not make sense to program very intense sessions that [he or she] would struggle to recover from."

Practicality plays a central role when it comes to nutrition. Sutton says an appropriate nutrition program "considers the client's food preferences, religion, family and work obligations, and culture and is customized and sustainable for the individual."





Last but not least, Fantigrassi says, a quality nutrition program “has to lead to the goals a client has set.” One client may want to lose weight, but another may want to gain muscle mass. Nutrition is the key to unlocking results for both clients.

## The Art of Behavior Change

Speaking of goals, although the client-trainer relationship often starts off with a modicum of momentum, goals sometimes get lost along the way. Remember Maria’s fat loss goal? It’s about more than shedding those 40 pounds; it’s about shifting behaviors and possibly confronting many barriers to lasting change. This will call for precise program design.

“One of the most important things in helping clients reach their goal is to listen and truly understand what their goals are,” says Dieter. “Oftentimes we put our own ideas for what a client’s goals should be on the client, not letting the clients tell us themselves. There is a lot of conversation that should be held between a trainer/coach and the client about what it takes to actually achieve the goals set forth, ensuring both the client and the trainer are on the same page.”

Again, to meet most health, wellness and weight loss goals, trainers must look beyond exercise and even nutrition. Hedegore says it’s important to focus on habits in general. For example, he suggests that both fitness and nutrition professionals encourage clients to get more sleep, as this will help them “make more of the hormone that makes you feel full and less of the hormone that makes you feel hungry.” He adds that lifestyle changes often work hand in hand, since “managing stress will often lead to decreased appetite, better sleep and more energy.” As an added bonus, with better sleep, more hormone consistency and regulation, and a smaller appetite, clients will likely have more willpower to make better food choices. Hedegore also suggests urging clients to reduce screen time, as this tends to result in more sleep, higher-quality sleep and less mindless eating.

It’s worth noting that there is a myriad of nutrition resources online, so clients need more than simple education. “Clients need *accurate* information combined with practical, real-world solutions that are individualized to their unique needs and goals,” says Sutton.

## Tools & Resources

- Academy of Nutrition and Dietetics: [eatright.org](http://eatright.org)
- American Nutrition Association: [theana.org/advocate](http://theana.org/advocate)
- Centers for Disease Control and Prevention: Healthy Weight: [cdc.gov/healthyweight](http://cdc.gov/healthyweight)
- National Institute of Diabetes and Digestive and Kidney Diseases Body Weight Planner: [niddk.nih.gov/bwp](http://niddk.nih.gov/bwp)
- USDA ChooseMyPlate: [choosemyplate.gov](http://choosemyplate.gov)

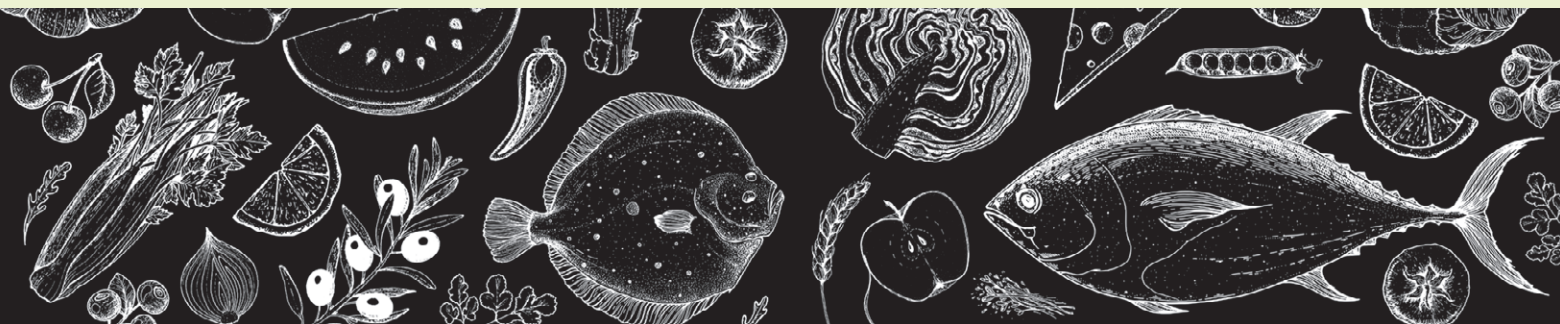
Sometimes, less is more, and trainers can often help by getting a client to focus. “Clients need someone to filter out the noise and to focus on what actually works for them,” says Dieter. “A large role of a nutrition coach is to help keep a client focused on the things that are important to them and not get overly distracted by new shiny toys (aka new diets or pills or programs).”

And while clients come to you with goals in mind, a trainer and/or nutrition coach can be very helpful when it comes to mapping out appropriate goals and addressing assumptions, especially regarding timelines. “Many people struggle with setting obtainable goals,” says Fantigrassi. “They are usually trying to do too much too soon, and they have unrealistic expectations of how fast, sustainable physical changes happen. Being a nutrition coach can help you provide guidance and accountability. You can help clients understand where they are and how to get to where they want to be.”



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**Andrea Blair Cirignano** is a writer, yoga and group fitness instructor, former group fitness supervisor, and mom in the Seattle area. She earned her bachelor’s degree in journalism and writes health and fitness articles for a variety of publications. In addition, she offers tips and advice for fellow fitness instructors and writers on her blog at [TheSweetestFit.com](http://TheSweetestFit.com). Find her at [@thesweetestfit](https://www.instagram.com/thesweetestfit) on Instagram.

References for this article available online at [blog.nasm.org](http://blog.nasm.org).









# CUSTOM PERFORMANCE PATHS FOR OLDER ADULTS: PROGRAM FOR ABILITY, NOT AGE

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Clients ages 60 and older have specific needs, goals and abilities—just like everyone else. Here's how to create programming for them based on solid training principles we already use, but with some additional age-related considerations.

RICH FAHMY, MS, NASM-CPT, CES, PES, SFS

Training modifications and exercise programming for older adults are popular topics across health and fitness publications and conferences. There's good reason for this: By 2050, the number of people 60 or older will increase to 2 billion, up from just 900 million in 2015. Put another way, in 30 short years from now, nearly a quarter of the earth's population will be over age 60 (WHO 2018). That adds up to a lot of potential members, clients and group fitness participants!

Many fitness professionals already gravitate to older populations because they are gratifying to work with. Given the right exercise programming, these clients can experience important increases in functional capacity and health—categories many trainers deem to be more impactful than aesthetics and sports performance.

Too often, though, we are told which exercises or training variables are “appropriate for older clients.” There are a couple of unintended consequences here: First, it suggests that many of the exercises we know and love are *not* appropriate for older clients. Second, it implies that older clients are, by default, limited in some way. Of course, neither is accurate.

So, how *should* programming for older adults differ from our usual approach? The short answer: At its foundation, it shouldn't have to. Great fitness professionals excel at meeting clients where they are—regardless of chronological age—and working with them to improve lifestyle and functional capacity in accordance with health and fitness goals. This means shifting our mindset from “age-based” program design to “capacity-based” programming. Though this sounds like a fairly simple change, it's important to understand *why* it matters—and how it applies to those we serve.

## The Individualized Process of Aging

According to the World Health Organization's 2015 *World Report on Ageing and Health*, **healthy aging** is “the process of developing and maintaining the functional ability that enables well-being at an older age.” Our goal as fitness and wellness professionals should be to assist our clients in maximizing their **functional ability**, or “the health-related attributes that enable people to be and do what they have reason to value” (WHO 2015). This process must be individualized to each client.

**Great fitness professionals excel at meeting clients where they are— regardless of chronological age—and working with them to improve lifestyle and functional capacity in accordance with health and fitness goals.**



#### INFLUENCES ON FUNCTIONAL ABILITY

Functional ability is a result of the complex interaction between a person's environment and his or her intrinsic capacities. **Intrinsic capacities** include all of the person's mental and physical capacities, including genetics, a predisposition to or presence of disease, and various lifestyle factors (WHO 2015). **Environment** includes everything in the individual's external world, including living space, local community resources and society at large. As a fitness provider or facility, you are part of a client's environment.

#### THE VARIABILITY OF PHYSICAL CAPACITY

**Physical capacity** is the body's ability to perform specific tasks. This is the component of intrinsic capacity that is most influenced by exercise and, therefore, by the work of fitness professionals. Physical capacity should not

be thought of as something that "automatically" declines with age but, rather, as something that falls within a range that typically widens as we get older.

In actuality, some people experience a decline in physical capacity earlier in life, owing to the interplay of environment and intrinsic capacities, so there are people in their 70s who have the physical capacities of individuals in their 20s.

#### ABILITY AND NATURE VERSUS NURTURE

Staying healthier and maintaining our functional ability as we age is neither random nor due to a genetic lottery. More relevant is whether our physical and social environments offer us opportunities to adopt a healthy lifestyle and give us access to adequate health care, programs and services. Some researchers suggest that genetics are responsible for only 25%–40% of healthy aging (NIA n.d.). This means

the remaining 60%–75% comes from lifestyle and environmental factors. Given the wide health range among older populations, combined with the relatively minor impact of genetics, it is easy to see why designing a program for an older client is a completely individualized process.

#### Exercise Progression and Functional Capacity

With any of our clients, we work to understand their baseline fitness level and abilities, then we combine this knowledge with their needs and goals to create a tailored exercise program. The program is then systematically progressed (i.e., the challenge level is adjusted) to maximize results. It's essentially no different with an older client. The two things to keep in mind are (1) as always, we must not assume anything about a client's ability prior to completing the intake

and assessment steps, and (2) exercise variable selection may need to be more creative than it would for a younger person.

#### ASK ABOUT PHYSICAL CHANGES AND CONDITIONS

The general approach of the NASM Optimum Performance Training™ model can be applied to any population; however, different client groups do face unique challenges. Older adults generally experience a number of physical changes, and exercise programming may need to take these into account. They include reductions in muscle mass and bone mineral density, a loss of elasticity in connective tissue, and a decline in balance and coordination skills. Compared with earlier in life, maximal heart rate and cardiac output may also be lower among older clients, while blood pressure will tend to be higher, both at rest and during workouts (NASM





## What Is Frailty—and Can Exercise Cure It?

**Frailty** is an umbrella term encompassing the overall impairment of a biological system's ability to respond to stressors. When trainers first begin working with older clientele, they often assume frailty right from the start. However, frailty affects only about 15% of U.S. adults over age 65, so the majority of your older clients will not be in a state of frailty (Bandeem-Roche et al. 2015).

Frailty often results from the convergence of aging, lifestyle and chronic disease. Declining physical activity and losses of muscle mass and musculoskeletal function are risk factors for frailty. Interestingly, frailty has also been found to be heritable, and genetic influences on frailty increase with age (Steves, Spector & Jackson 2012).

The underlying good news here is that muscle mass and function are trainable, so while exercise doesn't "cure" frailty, its muscle-related aspects can be improved, at the very least. Resistance training is often well-accepted by frail populations and is shown to be beneficial to their physical capacity (Lopez et al. 2018).



**Strength, mobility and the ability to move quickly are all important qualities for older clients to develop, so don't shy away from appropriate resistance training; flexibility exercises; power training; and speed, agility and quickness (SAQ) training.**

2018). As with clients at any age, there may also be health conditions, medications and previous injuries that affect exercise ability and performance. ("Age-Related Changes—and How to Accommodate Them," page 48, offers tips for addressing some of the most common.)

To be sure you have all of the information you need to keep your older clients safe, have them complete the Physical Activity Readiness Questionnaire (PAR-Q) as part of their intake. This can help you decide whether you want them to provide a doctor's clearance before they begin working with you (NASM 2018).

### ESTABLISH A BASELINE WITH ASSESSMENTS

Movement assessments, such as the overhead squat, single-leg balance, push, pull and sit-to-stand (from a chair), are a great place to start (NASM 2018). More advanced assessments, like those found in the *NASM Essentials*

*of Corrective Exercise Training* manual, are also appropriate. For example, the treadmill walking (gait) assessment and the upper-extremity transitional assessments will provide a snapshot of clients' starting mobility and neuromuscular control (NASM 2014).

Other tests can be adapted for this group, too, keeping in mind age-related reductions in muscle mass and cardiac output. Instead of a one-repetition maximum strength test, for example, you can do a 10-RM, and cardiorespiratory fitness can be measured with the "talk test." Assessments should be selected and modified to suit client goals and abilities.

### Get Creative With Exercise Progression/Regression

Proper exercise progression and regression is one of the most essential skills that fit-

## Age-Related Changes—and How to Accommodate Them

When training older clients, it is more likely that some accommodations will be necessary due to the greater prevalence of health conditions, preexisting injuries and other factors. However, the rate at which different physiological systems experience change or decline will be unique to each individual (Steves, Spector & Jackson 2012). An older client may experience none or all of the age-related changes listed below; thus, a thorough client intake is necessary to create a unique health and wellness baseline.

The table gives accommodations that can be used to address common age-related changes, many of which are discussed in depth in the *NASM Senior Fitness Specialist Manual*.

| AGE-RELATED CHANGES                                                                                                        | EXERCISE PROGRAM MODIFICATIONS                                                                       |
|----------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|
| <b>cardiovascular system:</b> decreases in cardiovascular efficiency, maximal heart rate, stroke volume and cardiac output | During exercise, always assess the client's perceived exertion.                                      |
| <b>chronic conditions:</b> increased risk or presence of cardiovascular disease, dementia, diabetes, etc.                  | Become familiar with any conditions a client has and regularly consult with the client's physicians. |
| <b>cognitive function:</b> loss of neurons, reduction in total brain weight and thinning of dendritic branching            | Select reactive exercises carefully, since response speed may be slower.                             |
| <b>mobility:</b> decline in gait speed                                                                                     | Emphasize the improvement of musculoskeletal health and functional mobility.                         |
| <b>motor skills:</b> more time needed to process new motor skills                                                          | Begin with simpler motor patterns, then progress systematically to complex ones.                     |
| <b>respiratory system:</b> decreased tissue elasticity, which results in lung expansion requiring more effort              | Carefully manage exercise volume to maintain stress/recovery cycles and prevent early fatigue.       |
| <b>sensory changes:</b> vision and hearing losses                                                                          | Develop the necessary communication skills to best serve this clientele.                             |

Source: NASM 2012.

To learn more detailed information on how to modify exercise programming for seniors, check out the **NASM Senior Fitness Specialization (1.0 NASM CEUs)** at [nasm.org/products/CEU140K](http://nasm.org/products/CEU140K).



ness professionals must master. Good exercise progression goes beyond simply selecting different exercises. It involves purposefully and systematically creating a stimulus that is just challenging enough to force the kinetic chain (aka human movement system) to improve in order to adapt to the stimulus. Not challenging enough, and the kinetic chain may not respond as desired. Too challenging, and the kinetic chain will struggle to execute the exercise well—the system may be overwhelmed and not recover properly. For all moves, the intensity should be appropriate to the client's goals and abilities, though the basic guideline for seniors is 40%–85% of  $\text{VO}_{2\text{peak}}$  (NASM 2018).

Strength, mobility and the ability to move quickly are all important qualities for older clients to develop, so don't shy away from appropriate resistance training; flexibility exercises; power training; and speed, agility and quickness (SAQ)

training. Below are details on a few of these.

### RESISTANCE TRAINING

With older adults, as with any other clients, resistance training should follow the principles of the NASM OPT™ model: Individualize, progress and schedule strength training, beginning with Phase 1: Stabilization Endurance. What is often overlooked with older populations is the importance of developing muscle growth (hypertrophy) and power (Phases 4 and 5). Even with age-related declines in muscle tissue, older exercisers who participate in long-term resistance training can preserve strength, power, and muscle mass and function (NASM 2012). Moreover, clients with compromised neuromuscular control, marked mobility limitations or frailty can still benefit from resistance training when it is properly applied. (See “What Is Frailty—and Can Exercise Cure It?,” page 47, for





**Progressions for older adults require us to be creative. If we understand the purpose behind a particular mode of training, we can create programs at many challenge levels—and thereby meet any client's needs.**

more on this condition.)

When coaching older clients, remember that it is critical for them to be able to maintain precise technique and kinetic chain control at all times to minimize risk of injury, so be sure to apply regressions as needed to make that happen (NASM 2018). On the other hand, don't stop your 80-year-old clients from deadlifting for eight repetitions if that's safe, if they qualify for it, and if it's appropriate to their goals.

#### SAQ AND PLYOMETRIC TRAINING

Integrated training components that are often underutilized with older adults include SAQ and plyometric training, and yet improving the ability to move with explosiveness, quickness and efficiency can benefit everyone—especially older clients experiencing mobility issues. Too often, when trainers imagine SAQ for an older adult, they picture aggressive cone or lad-

der drills that they fear may lead to injury, so they omit this type of training. Other fitness professionals are so afraid to “break” their clients that agility training becomes too simplistic to produce real improvement. The bottom line is that ladder drills, simple step patterns and everything in between are great if they are appropriately selected, individualized and applied. The same is true for plyometric training.

Remember: Progressions for older adults require us to be creative. If we understand the *purpose* behind a particular mode of training, we can create programs at many challenge levels—and thereby meet any client's needs.

#### The Role of the Fitness Professional

The key takeaways here: Chronological age is not a measure of physical or functional capacity. Though we should be aware of common age-related declines

## Sample Assessment: SAQ and the TUG Test (With Progressions/Regressions)

Let's consider a common example of a speed, agility and quickness (SAQ) exercise progression for clients with mobility limitations and/or slowed gait speed. In research, gait speed is often used as a measure of functional capacity and seen as an indicator of overall musculoskeletal health in older age (WHO 2015).

**Gait speed** is the time required for an individual to walk a predetermined distance (often 4 meters, or 13.12 feet) using their usual (habitual) gait. It can also be evaluated during a multicomponent task that mimics important activities of daily living. A simple place to start is with variations of **timed-up-and-go (TUG)** tasks used in research (Cadore et al. 2014).

**The TUG Test.** In its most basic application, clients are timed as they rise from a chair, walk 3 meters (about 10 feet), turn around, walk back to the same chair, and sit down again.

**Regression of the TUG Test.** For a client with advanced mobility limitations, a TUG task can be regressed to standing from the chair with assistance, taking 1 or 2 steps, then returning to the seated position with assistance. Another example: Clients with somewhat greater balance and mobility can stand and sit without assistance and walk for 1 meter instead of 3.

**Progression of the TUG Test.** There are many options for this, including increasing travel distance or gait speed, using patterns such as side steps or shuffles, and having clients navigate obstacles. At an advanced level, an isometric squat position can replace the “seated” position, and the “go” portion can incorporate complex patterns, sprinting and/or explosive movements.

As you see, the TUG Test can be the basis of a multitude of SAQ progressions for older clients, ranging from those who are frail all the way to advanced athletes. Again, the important thing is to base progressions on the client's capacity, not on age.

in physiological function, we must remember that there is no such thing as a “typical” older person, so we should approach all clients with the mindset of *assess, not assume*.

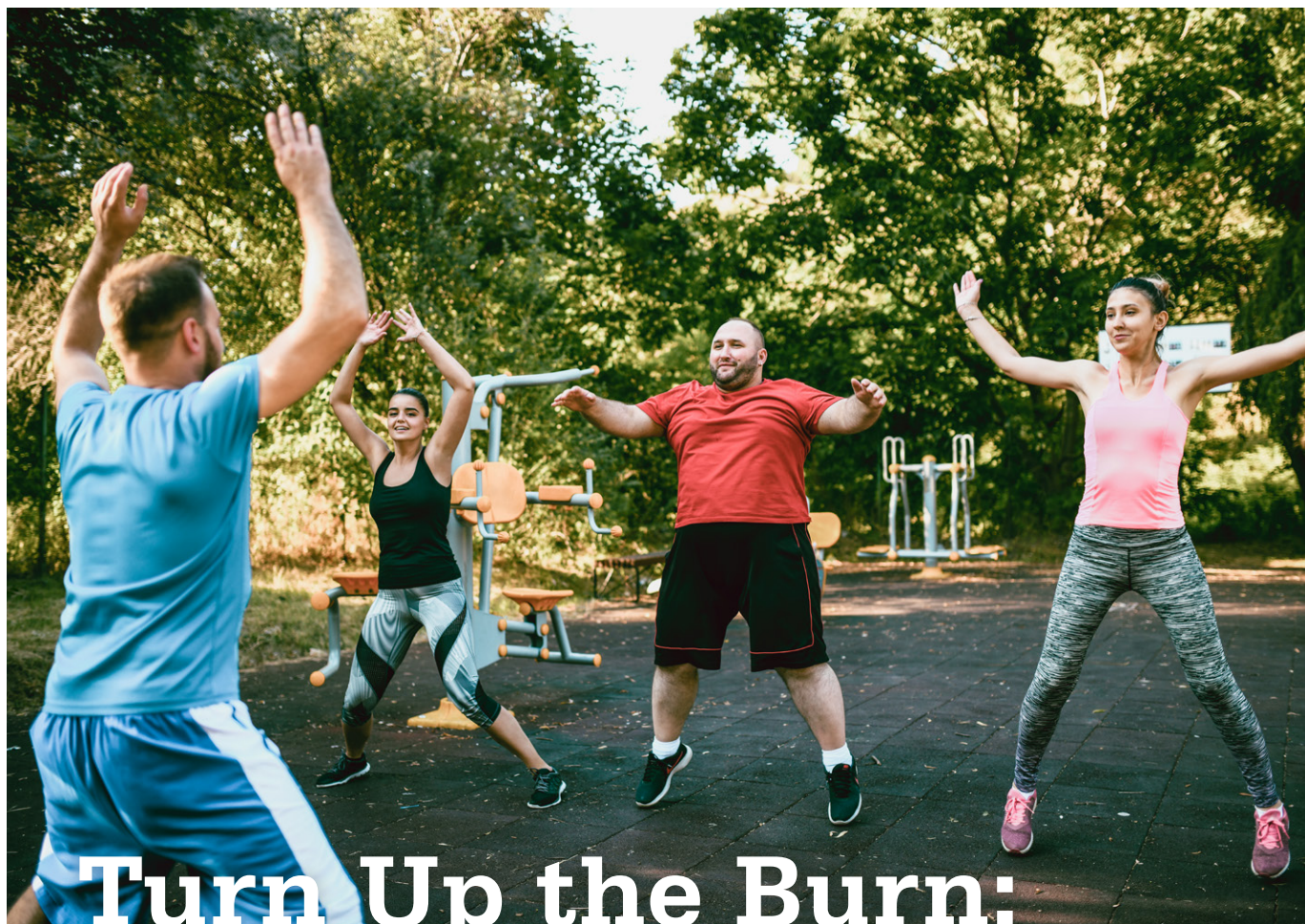
In sum, when working with an older adult—as with any client—you need to ask yourself: Does this particular individual have the capacity to do what he or she wishes to do within the current set of circumstances and opportunities? And if not, what can we do about it?



**RICH FAHMY, MS, NASM-CPT, CES, PES, SFS**, is a 20-year veteran of the fitness

industry. As a content manager for NASM, he oversees the development of various courses and workshops, including ones on senior fitness.

References for this article available online at [blog.nasm.org](http://blog.nasm.org).



# Turn Up the Burn:

## The NASM OPT™ Model and the Weight Loss Client

DON'T SACRIFICE ESSENTIALS LIKE FLEXIBILITY TRAINING AND CORRECTIVE EXERCISE TO HELP WEIGHT LOSS CLIENTS MEET THEIR GOALS. YOU CAN MAKE THE MOST OF YOUR TIME TO KICK UP THEIR CALORIE BURN AND PROGRESS THEM SAFELY.

BY RICK RICHEY, DHSC, MS

Consider a client named Jordan. She is in her late 50s and has tried all kinds of diets and various workouts, but even when she succeeded, the weight crept back. You're a big supporter of the NASM Optimum Performance Training™ model, but you're fairly certain that Jordan won't be happy if you drag out a foam roller at the start of her first session. Her main goal, she has told you in no uncertain terms, is to lose weight—20 pounds, to be exact.

Unfortunately, many weight loss clients (and the fitness professionals who train them) wonder why they should spend time on things like assessments, self-myofascial release, flexibility training and corrective exercise. These activities do not burn tons of fat or energy, so their value is not immediately obvious when weight loss

is the goal. (How to help clients reframe their goals in terms of health and other nonscale improvements is a discussion for another day.)

However, good trainers are defined, not by their ability to help clients burn copious amounts of calories, but by their skill in aiding clients to reach their goals

safely, effectively and efficiently. The NASM OPT™ model is designed for exactly that, when used in its entirety. This means following all of the model's progressions and guidelines with *everyone*, even clients who are hyperfocused on a single outcome.

### Maximize Fat Loss With Creative Programming

The *easiest* way to build more calorie-burning into a training session is to teach clients to do self-myofascial release, stretching and muscle activations on their own. This way, a trainer can plan a full 60-minute exercise routine for trainer and client to do together in the gym. But due to physi-



cal limitations, time constraints or poor adherence, this may not be workable for all clients. In these cases, there are some simple ways to increase a session's metabolic demands and leave plenty of time for those important "extras."

Let's look at what we can do to maximize fat loss in the 40-minute workout portion of a 60-minute session of Phase 1 Stabilization Endurance training—while still allowing for a 10-minute warmup and a 10-minute cooldown.

## Make Every Second Count With Circuits

Resting after each set is an extremely common practice, but it limits the total amount of work and metabolic demands placed on the body during a specific time frame. Circuit training limits the rest interval until after completion of a predefined series of exercises, thereby shortening overall rest time throughout the session.

Circuits can be done in a relatively short amount of time and still provide excellent benefits. Kirk et al. (2009) designed a re-

**Good trainers are defined, not by their ability to help clients burn copious amounts of calories, but by their skill in aiding clients to reach their goals safely, effectively and efficiently.**

sistance training program that increased metabolic effect and energy expenditure in just 11 minutes. Even in this short time (11 minutes!), an increase in energy expenditure can favorably affect body composition. I am not suggesting limiting resistance training to 11 minutes, but you could triple or quadruple that duration and still have time for assessments, foam rolling, stretching, core, balance and other components of exercise programming.

## How Circuits Equal a Greater Calorie Burn

Here's the math: During Phase 1 Stabilization Endurance training, each repetition is performed at a slow tempo (4/2/1), so each rep lasts approximately 7 seconds. Since the repetition range is 12–20, the total time per set is 84–140 seconds. Translation: A

single 20-rep exercise equals roughly 2.5 minutes of continuous resistance training.

A typical vertical-load circuit may include the following types of exercises prior to resting: total body, chest, back, shoulders and legs. If all five of these exercises are done at a 4/2/1 tempo for 20 reps each, the series provides a total of 700 seconds (11 minutes 40 seconds) of exercise. Do the series three times through, and you're at 35 minutes. Even with a few seconds of "transitional" rest when switching between exercises, this leaves nearly 25 minutes for other activities.

## What Research Says About a Slow Tempo

In a 2012 study, Mukaimoto & Ohno used a four-exercise circuit, which participants performed in three ways: slow



## Sample Phase 1: Stabilization Endurance Circuit With Mini Cardio Bursts

This circuit allows for stabilization, endurance and metabolic outcomes to be accomplished on all fronts. Remember to have clients do each set to fatigue, which can be voluntary ("I think I should stop there") or observed (you see that a client cannot perform the exercise again without compensation). Keep in mind that this program allows for 20 minutes of a 60-minute session to be split between a warmup and a cooldown.

### 40-Minute Circuit

|                                                                     |                                                     |
|---------------------------------------------------------------------|-----------------------------------------------------|
| <b>total-body exercise:</b><br>dumbbell squats<br>to overhead press | <b>60-second cardio burst:</b><br>speed jacks       |
| <b>chest:</b><br>pushups                                            | <b>60-second cardio burst:</b><br>mountain climbers |
| <b>back:</b><br>body-weight rows                                    | <b>60-second cardio burst:</b><br>high knees        |
| <b>shoulder:</b><br>single-leg bent-over YTs                        | <b>60-second cardio burst:</b><br>ice skaters       |
| <b>legs:</b><br>reverse lunges                                      | <b>60-second cardio burst:</b><br>burpees           |

# Myth Buster: Fat Burn and Exercise Intensity

Weight loss clients often have preconceived notions and misperceptions about what strategies work (or don't). That's why the NASM Weight Loss Specialization (1.9 NASM CEUs) provides insights into numerous myths and what science says about them. One such example covered in the WLS textbook is this: "You have to exercise at a low intensity, or you won't burn fat." According to the book, this has a "distorted grain of truth" in it.

"During exercise of low intensity, there is a higher percent contribution from fat as a fuel source. However, this is offset by the higher energy expenditure during high-intensity exercise" (NASM, p. 97). The table below makes these relationships easier to see:

## Calorie and Fat Expenditures

| Intensity | Calories Burned  | Total Fat Calories Expended | % Contribution From Fat |
|-----------|------------------|-----------------------------|-------------------------|
| low       | 100 kilocalories | 60                          | 60%                     |
| high      | 500 kcal         | 200                         | 40%                     |

In a study by Miller et al. (2014), eight obese men completed a 30-minute high-intensity circuit training workout three times per week for 4 weeks (a total of 6 hours of exercise). Data analyses before and after HICT revealed a 3.6% decrease in fat tissue percentage over the course of the study, as well as reductions in resting heart rate, systolic blood pressure, cholesterol, insulin and other metrics.

The major difference between this workout and an NASM OPT™ model Phase 1 workout is that the tempo in the study group was as fast as could be performed. With this in mind, keeping slow resistance training while getting creative with programming—varying intensity and other factors—could increase metabolic demands.

To learn more about the Weight Loss Specialization program, visit [nasm.org/products/ceu161k](http://nasm.org/products/ceu161k).

tempo, low intensity; normal tempo, low intensity; and normal tempo, high intensity (each protocol had its own day). VO<sub>2</sub> consumption was measured continuously throughout each exercise session and for 180 minutes after.

There was no difference in excess post-exercise oxygen consumption (EPOC) after the workouts were complete, but during the slow-tempo circuit, participants consumed significantly more oxygen than they did during the other exercise sessions. As oxygen is a vital component in metabolism, this indicates that the slow-tempo circuit produced greater caloric expenditure than either of the other two formats.

## Boost the Burn With Mini Cardio Bursts

If you want to make metabolic expenditure even greater, you can add a 60-second cardio burst at the end of each set in the

strength training circuit. This increases metabolic expenditure, boosts intensity, and results in higher heart rate spikes during the workout. Plus, it adds only 5 minutes to the total circuit time. This cardio-enhanced circuit—three times through—takes 40 minutes to complete, is incredibly challenging for all clients and still leaves 10 minutes before and after for warmup and cooldown. It also allows the resistance tempo requirements of the NASM OPT model to stay intact. See the sample workout on page 51 for how this might look in practice.

## Keep Clients Safe While Losing Weight

The NASM OPT model is a smart system designed to fine-tune the whole body, not just parts of it. This helps to keep your weight loss clients safe—and focused on more than burning calories.



**RICK RICHEY, DHSC, MS, NASM-CPT, CES, PES, is a fitness industry educator and owner of ReCOVER and Independent Training Spot in New York City. He completed his DHSc at California University of Pennsylvania in 2018 and has trained numerous high-profile and traditional clients.**

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# Crafting Creative HIIT Classes

HELP PARTICIPANTS REACH THEIR FITNESS GOALS WITH SCIENCE-BACKED SETS.

BY LYNNE SKILTON-HAYES

High-intensity interval training (HIIT) continues to be a staple in group fitness classes. A high-intensity bout of work followed by a short rest period, repeated several times, gets results—and everyone likes results! How can you take your knowledge of this format to the next level for your participants? Brush up on your understanding of HIIT and how to implement it for the best possible outcome.

## HIIT Benefits

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One of the main benefits of HIIT is efficiency, especially for those with busy schedules. Finding enough time to meet weekly exercise recommendations can be a challenge. HIIT allows clients to get more

done in less time, offering them more bang for their buck. To deliver rewards, HIIT typically involves short bursts of intense exercise ( $\geq 90\%$  of maximal aerobic capacity) interspersed with breaks of varying lengths (Boutcher 2011; Kessler, Sisson & Short 2012).

Immediate responses to a HIIT workout include

- an increase in lactate levels, up to 10 times above baseline;
- increased levels of free fatty acids and blood glycerol, which suggest an early breakdown of triglycerides;
- a steady decline in adenosine triphosphate (ATP) and phosphocreatine, used to meet the rapid-fuel needs of contracting muscles;
- an increase in growth hormone, up to 10 times above baseline; and



- enhanced venous blood flow to the heart, which increases stroke volume.

Sources: Boutcher 2011; Kravitz 2014.

A comprehensive HIIT research review found that healthy young and older men and women can improve  $\text{VO}_2\text{max}$  by 4%–46% in training periods lasting 2–15 weeks (Boutcher 2011).

What does this research mean for your group classes? It means you have science behind the methods that you teach and that you are helping people to reach their goals efficiently.

## HIIT Recommendations

For the purposes of teaching HIIT in a

group setting, it's important to consider a few basic recommendations:

- Generally speaking, people should have about 3 months of experience with cardiovascular training before beginning HIIT.
- If participants are performing HIIT correctly (intensely), they should do it only about two or three times per week. Since exercise intensity and duration are inversely related, it's best to keep duration to 20–30 minutes (or less, in some cases) to decrease injury risk.
- Safety is paramount. Many HIIT workouts include multijoint, compound exercises. It's important to provide alternative movements to those who are less skilled. Technique and quality should always take precedence over volume or number of reps.
- Movement preparation is imperative. The warmup should include exercises that take the body through all planes of motion, and there should



## Sample HIIT Class

There are many different HIIT formats to choose from, all of which can yield great results. This 30-minute sample class includes a few “mini-templates.” A note about intensity: It's relative to the individual. One person's “breathless” may be another person's “moderate.” When cuing the hardest parts of this workout, encourage attendees to push to their individual maximum, whatever that may be.

**Warmup:** Spend at least 5 minutes preparing the body for the workout. Here are some ideas:

- body-weight squats
- inchworms
- “Frankenstein” kicks
- side lunges
- arm circles
- reverse lunges

### MAIN WORKOUT

**Set One:** 30/20/10 (in seconds) (moderate/hard/hardest) = 1 minute of work

- Squat, 30 seconds (moderate).
- Hold squat and pulse, 20 seconds (hard).
- Jump squat, 10 seconds (hardest). Keep knees bent and stay low while feet come off ground.

Rest, 1 minute.

**Set Two:** 30/20/10 (moderate/hard/hardest) = 1 minute of work

- Hold squat, keep feet flat on floor, press knees out, 30 seconds (moderate).
- Hold squat at bottom, 20 seconds (hard).
- Jump squat, trying to get as high as possible, crossing feet at top of movement. Absorb landing by slightly bending knees, 10 seconds (hardest).

Rest, 2 minutes.

**Set Three:** as many *good* reps as possible (AMGRAPS) Focus on quality movements with a shorter work bout. These sets can be

- timed: 45/15; 50/10; 30/30, etc., or
- repetition-based: Complete 10 reps and then move on.

For this example, we'll go with two rounds of 45/15, with 1-minute rest between rounds, for 13 minutes total.

- Hook, slip, hook, slip: With left foot forward, hook with L arm. Elbow leaves side of body as torso rotates. Hand stops just past opposite side; arm is parallel to floor. Use oblique on punching side to pull arm back in place (the “slip”). Repeat.
- Side plank with hip flexion/extension: Hold an elbow side plank, either on knees or feet. Keep body perfectly still as you move top leg forward and back.
- Drop pushup: Start in side plank, hand and feet on ground. Rotate toward floor and, as second hand touches ground, bend elbows and drop into pushup. Press up, ending in side plank on opposite side; reverse direction to repeat.





# Learn How to Master Interval Training in Indoor Cycling Classes

Many indoor cycling classes focus on high-intensity interval training, due to its many benefits, most notably time-efficiency. However, when overdone or used in the wrong way, HIIT can increase injury risk and diminish the exercise experience for some participants. AFAA's new G.E.A.R. Indoor Cycling Instructor Certification teaches key HIIT principles and how to apply them to this training method, while providing a better understanding of appropriate interval intensities, recovery ratios and training loads. As a result, you will be able to design classes that use (but do not abuse) this popular training method to deliver a safe, results-oriented experience. To learn more about this certification, visit [afaa.com/newgear](http://afaa.com/newgear).

be opportunities to practice major joint movements you plan to do in the workout.

- Recovery is essential. The HIIT sets in the "Sample HIIT Class," below, include a longer work period, but once a set is over, the rest period lasts 2–4 minutes.

## Apply Your HIIT Knowledge

When you combine research with your existing teaching skills, magic happens in the fitness studio. HIIT is a perfect format to stimulate results while keeping people interested and coming back for more. Brush up on your understanding of HIIT and then offer creative class experiences.

- Lateral skater, single-leg jump: Do alternating side-to-side skaters, 3x. On third one, jump once, outside leg only. Slightly bend knee to absorb landing.
- Hook, slip, hook, slip: Repeat first move of set, right side.
- Side plank with hip flexion/extension: Repeat second move, opposite side.

Rest, 2 minutes.



**Set Four:** hard/harder/hardest, 20 seconds each

- Deep lunge: Start with back knee on floor, ensuring front knee is at 90 degrees. Stand up, extending both knees.
- Pulse lunge, lifting back leg only. Arms punch up and down.
- Power lunge: Have both feet leave ground, both arms punching.

Rest, 2 minutes.

**Set Five:** Tabata, 20 seconds "all out," 10 seconds rest, 8x, 4 minutes total

- Sets 1, 3, 5 and 7: Do jumping jacks with speed (air jacks). Spend as little time on ground as possible. When feet come off floor, circle arms back. Complete as many as possible in 20 seconds.

- Sets 2, 4, 6 and 8: Jab, jab, hook. Arm extends straight out, palm down, elbow extended, aiming at target in line of sight. Punch right/left/right and then left/right/left.

Rest, 2 minutes.

## COOLDOWN (5 MINUTES)

Spend the last few minutes bringing down heart rates and transitioning into stillness. Take the class through a total-body stretch and recovery, using the following ideas as inspiration.

- triceps and shoulder stretches
- wide-legged forward fold, hands interlaced behind back
- runner's lunge/quadriceps stretch
- downward-facing dog
- child's pose



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# Nutrition [ FOOD NEWS & FACTS ]

## Troubleshoot the Plateau: Cut Calories or Boost the Burn?

**W**eight loss plateaus are such a prevalent problem that a whole chapter of the NASM Nutrition

Certification textbook is devoted to managing them and maintaining long-term weight loss. When a client approaches you about a plateau, it is important to explain what that means. By definition, a plateau is a period of stalled progress *lasting 4 weeks or longer* (not less, because water weight naturally fluctuates quite a bit throughout the month).

Once you decide it's time to employ plateau-busting measures, the next question is "how?" "As a nutrition coach, I'm not going to be dictating what [clients] should do," says Brian Sutton, MS, MA, NASM-CES, PES, CNC, who helped develop the NASM-CNC program. "I'm going to be asking open-ended questions to help them problem-solve as I provide guidance."

Here are a few questions to review when clients are stuck:

**Is there room to safely decrease calories?** If self-reported hunger levels are not too high, cutting calories may be a good place to start. As we lose weight, our metabolism slows, so we need fewer

calories to maintain body weight—and fewer than *that* to continue to lose pounds.

**Are self-reported hunger levels high?** If so, increasing exercise may be a better idea than cutting calories. However, make sure clients are not confusing hunger and appetite. "Appetite involves above-the-neck physical sensations such as seeing or smelling food that drives a person to eat, whereas hunger involves below-the-neck sensations such as low blood sugar, a growling stomach and fatigue," says Sutton.

**Are clients reporting food intake accurately?** Some may underreport intentionally to "please" their trainer. If you suspect this is happening, try recommending an *increase* in calories; it may improve adherence by making the goal more achievable. Other clients may forget to include items like condiments, snacks and beverages.

**Is there room to increase formal exercise?** If so, consider adding something different, rather than more of the same. "Unaccustomed exercise causes a greater calorie burn during and after the workout," says Sutton. If not, suggest

clients add some recreational activities that involve movement, like cycling or hiking.

**How much are people moving throughout the day?** It's possible to burn quite a few calories through everyday movements: fidgeting, pacing while on the phone, taking the stairs (not the elevator) and parking at the far end of the lot, for example. "Nonexercise activity—all the little movements *outside* of structured exercise—burns way more calories than one workout," says Sutton. "Increasing these activities is a huge strategy for weight loss."





## WHY POOR SLEEP MAKES US SNIFF OUT HIGH-CALORIE FOODS

In a recent study, researchers led by Surabhi Bhutani, PhD, of San Diego State University set out to investigate why people tend to eat foods with a higher energy density after a poor night's sleep.

The scientists provided 25 men and women with a buffet of snacks and told them to eat as much as they wished. Afterward, the team studied participants' brain scans and bloodwork.

They found that when participants got just 4 hours of sleep at night, they had higher blood levels of endocannabinoids the following day. (These are brain chemicals similar to those in cannabis, known to trigger the munchies.) Further, MRI scans revealed changes in communication between two regions of the brain that help control food intake. Simply put, the brain became more sensitive to food odors, possibly making high-calorie choices more enticing.

To hear Bhutani explain these mechanisms briefly, in her own words, listen to part 1 of Episode 61 of the eLife podcast on [elifesciences.org](http://elifesciences.org) (October 2019).

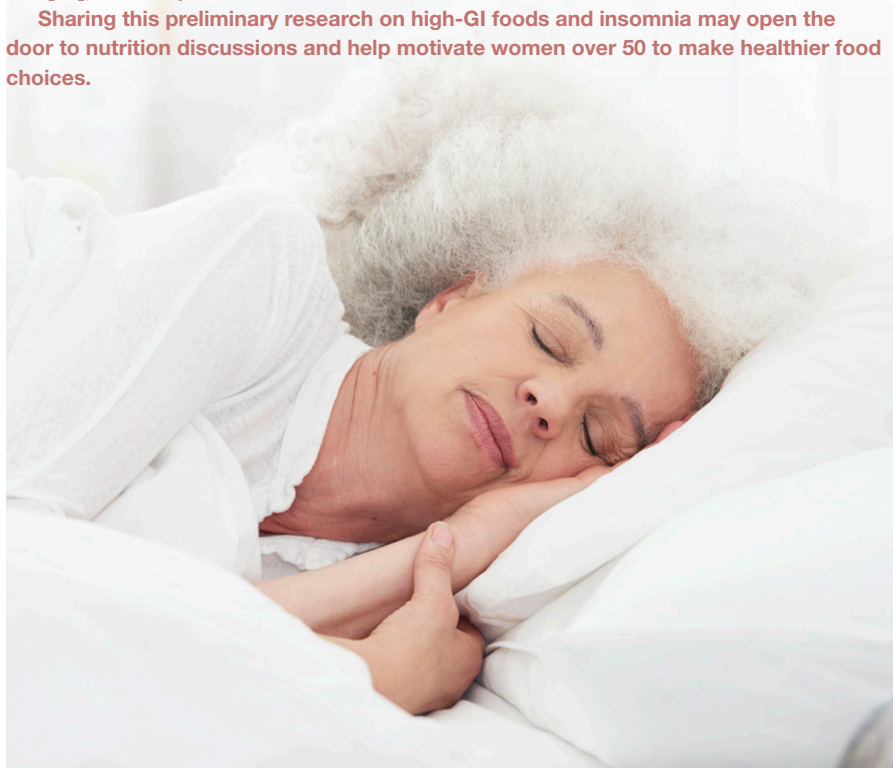
## Using the Glycemic Index to Prevent Postmenopausal Insomnia

Up to 61% of postmenopausal women report sleeplessness (National Sleep Foundation 2020). That can make it tough to opt for healthy foods, and yet, eating healthy foods may be the key to sleeping better!

In a recent article in *The American Journal of Clinical Nutrition*, Gangwisch et al. reported that foods with a high glycemic index may be a risk factor for postmenopausal insomnia—and that swapping out high-GI foods for lower-GI choices should be studied as a possible intervention (2020; 111 [2], 429–39).

Unfortunately, another study (this time in *JAMA*) found that, while most Americans reduced their intake of “low-quality” carbohydrates between 199 and 2016, there was no improvement in adherence to dietary guidelines among adults over age 50 (2019; 322 [12], 1178–87).

Sharing this preliminary research on high-GI foods and insomnia may open the door to nutrition discussions and help motivate women over 50 to make healthier food choices.



## EARTH DAY UPDATE

## NUTRITIOUS FOODS HAVE A SMALLER ECO-FOOTPRINT

Here's another way to “sell” clients on healthy eating: Let them know its positive impact on the planet. A study published recently in the journal

*Proceedings of the National Academy of Sciences* concluded that foods that benefit health also tend to have the lowest impact on the environment—while, conversely, foods that nega-

tively affect the planet are linked to a higher risk of disease.

Two exceptions are sugary beverages (bad for health but not the Earth) and fish (a healthy protein source that has a moderate impact on the planet). Even so, fish was found to have a “markedly lower” environmental footprint than either red or processed meat.

The research paper sums it up: “Dietary transitions toward greater con-





The team used a mathematical model, along with data on various age groups regarding obesity and excess sugar. “Our results suggest that the dietary habits learned by children 30 or 40 years ago could explain the adult obesity crisis that emerged years later,” says Damian Ruck, PhD, co-author of the study, which was published in *Economics and Human Biology* (2020; 36, 100818).

The scientists theorize that adult obesity may have even begun in the womb, since sugar consumed by pregnant women has been shown to increase fat cells in their babies. What’s more, infants in the 1970s were the first generation to consume baby food that was “extremely high in sugar,” and in childhood, they grew up with foods and drinks sweetened with high-fructose corn syrup. Those kids are in their late 40s today, and some may be your clients.

Knowing this doesn’t make it easier for adults to lose excess weight now, but it does affirm the importance of mindful eating. Nutrition choices today clearly have a lasting impact on health—and may affect future generations, too.

## A Moment on the Lips a Lifetime on the Hips

Could the adult obesity crisis in America have started when we were kids? New research from the University of Tennessee, Knoxville, suggests the answer may be yes. And it could explain why obesity rates seem to have peaked in 2016, even though American consumption of excess sugar (a known contributor to obesity) has been declining since 2000.

sumption of healthier foods would generally improve environmental sustainability.” Now, put *that* on your plate!

**REFERENCE:** Clark, M.A., et al. 2019. Multiple health and environmental impacts of foods. *Proceedings of the National Academy of Sciences*, 116 (46), 23357–62.



## Whip Up Some Harissa (It’s the New Sriracha!)

**A**ccording to data from Uber Eats searches, one of today’s hottest commodities in takeout is harissa—a spicy chili pepper paste originally from North Africa ([uber.com/newsroom/a-look-back-at-2019](https://www.uber.com/newsroom/a-look-back-at-2019)).

While harissa is often made with dried peppers, Nargisse Benkabbou, author of *Casablanca: My Moroccan Cuisine* (Octopus Publishing Group 2018), starts by roasting hers in the oven. She also keeps it very simple. “In Morocco, we like our harissa pretty basic,” she explains. “We usually don’t include too many herbs and spices in the recipe so we can add it to any meal without having a conflict of taste. Well, that’s what my mom said!” Here’s how she does it:

**Gather the ingredients.** 3½ cups red bell peppers and 1–4 chili peppers (both seeded and deveined), 5 garlic cloves (peeled), olive oil, salt (to taste).

**Roast the peppers.** While you can sun-dry your peppers, Benkabbou roasts hers in the oven at 250 degrees Fahrenheit, along with the garlic, for about 1 hour, drizzled with 2 Tbl oil. When cool, chop finely or purée in a blender or food processor.



**Cook off the liquid.** Cook the mixture in a large, deep pan over medium-low heat for about 45 minutes, stirring occasionally, until all the water evaporates. Add salt to taste. Store in the refrigerator in a sterile jar, topped with 2 Tbl olive oil (for preservation), for up to 1 month.

**Put it to use!** Benkabbou adds harissa to chutneys, stirs it into coleslaw, and adds it to dressing. For a sweet/savory taco sauce, she mixes harissa with cashew butter, garlic and lemon juice. For a quick snack, she coats chickpeas with harissa and bakes them until crispy.

Find more of Benkabbou’s lively cuisine and information on her cookbook at [mymoroccanfood.com](https://mymoroccanfood.com).



## Good to Know: Anorexia Nervosa Comes in All Sizes

**D**isordered eating is not always easy to spot. “People with atypical anorexia nervosa (AAN) do not have a very low BMI, so even though it’s probably a more typical form of anorexia, it often goes undiagnosed,” says Jessi Haggerty, RD, NASM-CPT, founder of the Nutrition & Body Image Coaching Course, a training she offers for fitness professionals.

Also, new research shows that, compared with others who have anorexia nervosa, those with AAN have the same indicators of malnutrition and a *greater* incidence of self-reported behaviors associated with disordered eating (*Pediatrics* 2019; 144 [6], e20192339). So it’s just as important to help them get the treatment they need to be healthy.

“Trainers can start screening for eating disorders as early as their first meeting with a new client by asking about weight changes and diet,” says

Haggerty. “Recent significant weight loss, a history of weight cycling (losing and gaining weight), and restrictive dieting are red flags that intervention might be helpful.”

When applicable, she also asks about menstruation. “Missed periods are a red flag that is often missed in higher-weight clients,” she adds. “So let’s get comfortable talking about periods, guys!”

Haggerty recommends (gently) referring at-risk clients to a registered dietitian and/or therapist who deals specifically with this diagnosis. However, she notes that you can make a difference every day, simply by considering the habits you promote. “Trainers can encourage clients to adequately fuel and refuel before and after their workouts; they can stress the importance of rest and recovery; and, most importantly, [they can] ditch weight loss as a measure of success.”

## EAT SMART WITH THE MIND DIET (THE TOP 5 DIET YOU NEVER HEARD OF)

In January of this year, *U.S. News & World Report* published its 2020 list of the “Best Diets Overall,” ranked by a panel of nutrition experts. In fifth place (alongside the Mayo Clinic diet) was the MIND diet. If you’ve never heard of it, you’re not alone—but you may know more about it than you think.

“The MIND diet is a combination of the Mediterranean diet and DASH (Dietary Approaches to Stop Hypertension)—two of the most well-researched diets that have been shown to improve blood pressure, BMI and blood glucose levels,” says Cassandra Padgett, MS, a health coach, founder of *vivfitness.com* and senior health educator for a pediatric clinic in San Diego.

The National Institute on Aging reported that adhering to the MIND diet lowered participants’ risk of Alzheimer’s disease by as much as 53%. In fact, its name (MIND) stands for Mediterranean–DASH Intervention for Neurodegenerative Delay. Basically, the MIND diet encourages eating leafy greens and other vegetables, berries, whole grains, fish, poultry, beans, nuts, wine, and olive oil, while limiting red meat, sweets, cheese, butter/margarine, fast food and fried food. For specifics on servings, visit *eatrightpro.org* and search for “The MIND Diet.”



**ANNE WARREN** has written about food and nutrition for magazines, including *Quick and Healthy Cooking* and *Prevention’s Guide to Weight Loss*, and for the books *Prevention’s Outsmart Diabetes* and *Smart Low-Carb Living*. She lives and cooks in Eastern Pennsylvania.



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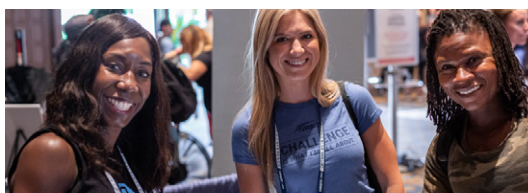
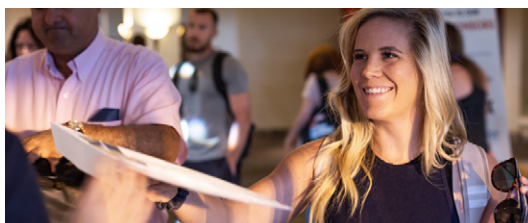


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# “Make Good Choices!”

## How to Coach Adolescents on Nutrition Decisions

ADOLESCENCE IS THE PERFECT LIFE STAGE FOR ADOPTING HEALTHY HABITS—AND YET YOUNG PEOPLE OFTEN FIND THIS VERY DIFFICULT TO DO. A LITTLE COACHING FROM THEIR FAVORITE FITNESS PROFESSIONALS CAN MAKE IT EASIER FOR THEM TO CHOOSE WISELY.

BY SARAH SNYDER, RDN

Fitness professionals who work with preteens and teenagers are in a powerful position to positively influence eating behaviors. This is when independence begins to be established with regard to food and beverage choices and meal preparation. Coaches and trainers often serve as mentors to adolescents, so this population may be receptive to our messages about healthy eating. This can significantly affect well-being—in adolescence and throughout adulthood.

Unfortunately, this group’s nutritional needs are often overlooked, leaving them at risk for developing *unhealthy* behaviors. Many adolescents lack basic nutritional and culinary knowledge. Also, their mealtimes are often irregular—because of their busy schedules—and they frequently skip meals. Further, they face potentially negative influences from peers, media, personal food preferences and even family. Combined, these factors can easily lead to excessive consumption of nonnutritive foods (e.g., processed foods and sweetened beverages) along with an inadequate intake of essential nutrients.

This is particularly problematic during this part of the life cycle because adolescent bodies are still growing and developing. As young people move through the stages of prepuberty, active puberty and postpuberty, they undergo specific physiological changes that require additional intake of certain vitamins and minerals.

While some young clients may need specialized nutritional counseling and

planning (see “A Few Words on Scope of Practice,” page 66), most will do well with guidance from coaches and trainers, who can offer simple ways to adopt healthier eating habits.

### Supporting the Physiological Changes of Adolescence

Many fitness professionals work with clients in all stages of the life cycle. Here are a few nutritional challenges that are specific to preteens and adolescents:

**ENERGY.** Energy needs vary tremendously during adolescence and can range from 1,600 to 3,000 calories per day, depending on factors such as physical activity level and current growth rate (Ellis 2019; Mangieri 2019). Like the onset of puberty, peak height-gain velocity occurs at different ages for different individuals. Typically, growth spurts in adolescent girls begin around 10 years of age and peak at about 12 (Sizer & Whitney 2020). Boys’ growth spurts begin at 12 and peak at about 14 years, finally slowing down around age

19 years (Sizer & Whitney 2020). Specific calorie intake guidelines (ordered by age and activity level) are shown in Table A2-1 in the 2015–2020 Dietary Guidelines for Americans (USDHHS & USDA 2015).

**CALCIUM AND VITAMIN D.** Calcium requirements are high during adolescence because of crucial bone development. For males and females ages 9–18, the Dietary Guidelines recommend an intake of 1,300 milligrams of calcium per day. Vitamin D also plays an essential role in supporting rapid bone growth and bone density. Dietary supplementation is often encouraged to ensure that adolescents meet the recommended 600 international units per day (USDHHS & USDA 2015). Unfortunately, sodas and other sugary beverages are often chosen over drinks fortified with calcium and vitamin D, such as nut or animal milk.

**IRON.** Both male and female adolescents need greater amounts of iron to support





an increase in blood volume and the development of lean body mass. Teen girls typically don't consume as much iron as boys, despite their need to replace losses due to menstruation (Sizer & Whitney 2020). Specifically, males and females ages 9–13 need 8 mg per day, males ages 14–18 need 11 mg per day, and females ages 14–18 need 15 mg per day (USDHHS & USDA 2015).

### Avoiding Diet Deficiencies and Unhealthy Excesses in Adolescence

Fewer than 10% of adolescents eat enough fruits and vegetables. This puts youth at risk for problems associated with low dietary fiber and inadequate amounts of micronutrients. Also, 90% of people in this age group consume more than their recommended upper limit of sodium (2,300 mg/day) (CDC n.d.); that increases their risk for electrolyte imbalances.

About 40% of adolescents' daily calorie intake is in the form of "empty calories" from added sugars and fats, found in foods like fast food, pizza, soda and sweets (CDC 2019). This will not only increase the risk

of overweight/obesity but can also lead to poor nutrition overall, as these foods often take the place of nutrient-dense foods. These factors help explain why teens are experiencing higher rates of overweight and obesity, high blood pressure, high blood sugar, type 2 diabetes, and irritable bowel conditions (Chaffin 2019; CDC 2019).

### Achieving Health and Fitness Goals During Adolescence

Adolescent clients will have diverse goals regarding sports, weight and health. Here are a few general strategies and suggestions for training clients in this age group:

**GENERAL HEALTH.** Encourage adolescents to include foods from all food groups daily, including a variety of fruits and vegetables, fat-free and low-fat dairy products, lean proteins, whole grains, and healthy oils.

**WEIGHT.** While weight loss requires a calorie deficit, adolescents must be careful to consume enough nourishment to support growth and prevent loss of muscle mass. Talk to them about limiting processed foods and controlling portions, and promote mindful eating (e.g., eating meals away from screens). Also recommend they avoid quick fixes like fad diets. Explain that "diet pills" may increase their risk for dehydration or toxicity and have generally not been safety-tested except in adults (NIH 2018).



### Message in a Bottle: Tips for Boosting Fluids

Adequate fluid intake is vital at every age; however, adolescents often do not meet the standards set by the European Food Safety Authority. Here are a few suggestions to help young clients aim for optimal hydration:

- Carry a refillable water bottle—and refill it often.
- Flavor plain water with cucumbers, mint, or fresh fruit such as berries, lemons, oranges or limes.
- Drink water before, during and after physical activity to prevent heat-related injuries and to maximize athletic performance.
- For game day and longer training sessions (more than an hour), consider rehydrating with a sports drink that contains carbohydrates, protein and electrolytes.

Sources: Bottin et al. 2019; Van Pelt 2015.

**SPORTS AND/OR ATHLETICS.** Adolescent athletes require more calories and other nutrients than their sedentary peers; however, nutrient needs will depend on the type, intensity and duration of training and competition. Explain this to your athletic clients. For example, if training is focused on building muscle strength and size, clients will need adequate amounts of both carbohydrate and protein to support new muscle growth, in addition to the bone development.

## Promoting the Intake of Necessary Nutrients

The fitness professional can urge adolescents to follow eating behaviors that promote optimal health. For example:

**ENCOURAGE FREQUENT MINI MEALS AND SNACKS.** Eating three mini meals and two or three snacks each day will help adolescents meet their elevated energy needs. Suggest carrying a small cooler with portable items to consume on breaks throughout their day.

**PROVIDE SIMPLE GUIDELINES.** For example, tell clients to eat a rainbow of fruits and vegetables to get an array of nutrients. Also, explain that a well-balanced mini meal includes three things: a low-fat protein, a healthy (whole-grain) carbohydrate, and a serving of fruit or vegetables. Protein and fiber help with satiety between meals. Some possibilities:

- nut butter, whole-grain crackers, small apple
  - low-fat cheese cubes, air-popped popcorn, cherry tomatoes
  - low-fat cheese and turkey slices, small whole-wheat tortilla, grapes
  - peanut butter, whole-grain bread, fruit preserves
- (Shield 2019)

## Screen Time: Use Tech to Promote Healthy Eating

Here are a few ways to use today's tech tools to share nutrition resources with teens and tweens:

- Share your mobile (work) phone number so they can text you questions and/or pictures of their meals.
- Help them create a balanced meal with a free app, such as MyPlate from the USDA ([choosemyplate.gov](http://choosemyplate.gov)) or the free Bam! Dining Decisions app from the CDC ([cdc.gov/healthyschools/bam/mobileapp.html](http://cdc.gov/healthyschools/bam/mobileapp.html)).
- Recommend your favorite free app for tracking foods and beverages.
- Use your social media posts to demonstrate your own healthy eating habits by sharing photos of your own plate.

## A Few Words on Scope of Practice

Be sure to keep your scope of practice in mind when working with adolescents. (This, of course, will differ among fitness professionals, some of whom are also registered dietitians or nutritionists.) Always refer adolescents to a registered dietitian or nutritionist if you feel further guidance is necessary or if an existing medical condition, including a food allergy or sensitivity, could affect nutritional status. As stated by the NASM Nutrition Certification textbook (chapter 2, page 5), "[If] any client has a change in health status, shows an unexplained drop or increase in weight, or shows signs or symptoms of a psychological disorder, the coach must not only recommend that his or her client consult with a professional, but also refuse further sessions until cleared by a licensed healthcare provider."

The NASM Nutrition Certification program offers an entire four-lesson chapter on the nutrition coach's scope of practice. For more information on the NASM-CNC, visit [nasm.org/CNC](http://nasm.org/CNC).

**OFFER A QUICK BREAKFAST MENU.** Suggest easy combinations that won't disrupt clients' already-rushed morning routines. Recommend mini meals that are rich in iron, calcium and vitamin C. For instance:

- low-fat Greek yogurt, granola, berries
- string cheese, dry whole-grain cereal, banana
- hardboiled egg, whole-grain toast, fresh fruit
- high-protein, low-fat granola bar, orange
- low-fat cottage cheese, unsalted mixed nuts, sliced pears

**IF CLIENTS SHY AWAY FROM VEGGIES, SUGGEST FORTIFIED FOODS.** Encourage clients who shun nutrient-dense vegetables, such as dark leafy greens, to supplement their

diets with foods fortified with iron, calcium and vitamin D. Whole-grain cereals and 100% juice are two examples.

**INVOLVE FAMILY MEMBERS WHEN POSSIBLE.** Advise caregivers in charge of family mealtimes to include whole grains, lean proteins, healthy fats, fruits and vegetables. Refer people to [myplate.gov](http://myplate.gov) for sound nutritional advice. Also encourage keeping the house stocked with healthy choices for adolescent children and their friends.

## Making Connections With Adolescents

When adolescents first come to you for training, their knowledge of nutrition will depend on school programs, family habits and other factors. It is important to meet young clients where they are and to give them the clarity they need to make independent decisions in the future. Taking a relatable approach when sharing information about healthy eating patterns will help adolescents to absorb it. (See "Screen Time: Use Tech to Promote Healthy Eating," left, for a few ideas.) Remember: Nutrition education should be fun—for your clients *and* for you!



**SARAH SNYDER, RDN, CPT,** is a health coach for a corporate wellness program based in Philadelphia. She has worked with many life-cycle populations and families to develop healthful meals and eating behaviors.

References for this article available online at [blog.nasm.org](http://blog.nasm.org).



# Finding Peace in a Stressful World

USE RESTORATIVE YOGA TO HELP YOUR CLIENTS AND PARTICIPANTS CALM THEIR NERVOUS SYSTEMS.



BY SHELBY LAFRINERE



People tend to measure themselves and their goals against certain metrics, some of which may be arbitrary. It's quite common for individuals to obsess about personal records, weight loss, strength gains, diet fixes—the list goes on. But what if you challenged your clients and participants to consider rest as another important box to check? And what about *your* self-care? Have you contemplated how doing less ultimately helps you to do more?

The COVID-19 pandemic has done more than just disrupt life as we knew it; it has also helped many people distill life to the essentials and focus on what really matters. One of those top priorities is health and, specifically, stress reduction.

The body is a complex weaving of multiple organ systems, and the nervous system is “the body’s electrical wiring . . . a complex collection of nerves and specialized cells” (Toro 2013). This system coordinates every activity in the body, and it is through it that we “perceive and function in the external world” (Kraftsow 1999). In postworkout recovery, it’s important not only to bring down heart rate and allow

muscles to unwind, but also to address the needs and changes of the nervous system. There are several wonderful, soothing ways to strengthen and support this system. In this article, we’ll focus on one tried-and-true method—restorative yoga.

## What Is Restorative Yoga?

Judith Hanson Lasater, PhD, PT, refers to restorative yoga as an “antidote to stress” (Shambala Publications 2011). It is, in effect, a passive form of asana sequencing that includes floor-based postures and props to support the body. Poses are generally maintained for 3–10 minutes. While a person may experience some stretch

sensation, stretching is not the goal. The goal is to deeply release tension and relax. A “typical” yoga class includes a sequence of standing and seated poses, followed by restorative options such as child’s pose or savasana at the end. A restorative yoga practice includes a sequence of poses designed to support relaxation, ideally with props. B.K.S. Iyengar is largely credited for developing many of the poses (Lasater 2011), and he also introduced the wide use of yoga props.

One cornerstone of any yoga practice is intention, and the intention in restorative yoga is to make the body *comfortable* while creating an environment that promotes total repose. That is not to say that this practice isn’t mentally challenging, however, since many people struggle to let go and surrender. It’s not unusual to discover that savasana is, in fact, the hardest pose, especially for people with a high-stress default setting.

Restorative yoga practice is designed to assist the body’s ability to switch back

## Typical Restorative Yoga Props

According to Judith Hanson Lasater, PhD, PT, in her book *Relax and Renew: Restful Yoga for Stressful Times* (Shambala 2011), restorative poses are about “being rather than doing.”

Key places to check for tension include the abdomen, lower back, jaw and neck. Here is a list of props you might find in a well-stocked restorative yoga practice.

- sandbags
- eye pillows/covers
- chairs
- blankets
- blocks
- bolsters
- towels
- belts or elastic straps
- wall

and forth between the parasympathetic nervous system (PNS) and the sympathetic nervous system. The former, referred to as the “rest and digest system,” is one of the autonomic nervous system’s major divisions. It is responsible for regulating many unconscious functions and “is composed of neurons located in both the brain and the peripheral nervous system that send their axons to target muscles, organs, and glands” (JoVE 2020). The PNS is also responsible for helping to maintain a calm mind, which makes it easier to remain present and focused.

Since restorative yoga is meditative in nature, it gives the practitioner an experience of physical calm and fosters the release of deeply held tension in the body. This reduces the development of secondary, stress-related problems over time. Stress, according to Lasater and other experts, can make you sick, and it begins with a physiological response to your perception that something is life-threatening. “For our ancestors, this may have been defending against the aggression of a hungry animal. For modern-day humans, this may be living with the fear of losing a job in a sagging economy, or the health crisis of a family member (Lasater 2011).”

## How to Apply Restorative Yoga to Mainstream Fitness

Restorative yoga is particularly beneficial for stressed-out clients who gravitate toward high-intensity activities, people who are working through injuries, and those who are trying to decompress from a major stressor like the pandemic. It is the “yin” to the “yang” found in most fitness regimens.

However, *everyone* can benefit from learning how to regulate the nervous system. Anecdotally, my clients have reported better sleep, greater calm under stress, and an increased ability to sense healthy alignment in their bodies when doing high-intensity or heavy-weight exercises. This not only helps them get stronger faster but instills a higher level of confidence both in and out of the gym. Some clients even report that it has helped them become more aware of their negative self-talk and suboptimal lifestyle choices; this increased awareness contributes to a healthier mind and body.

While you can certainly share restorative yoga poses at the end of a class or personal training session, this practice is best done when the body is already in a state of rest or semirest. Be mindful to lead your clients

through a cooldown before taking them through a sequence.

Note that “authentic” restorative yoga uses numerous props for most poses. It is not uncommon to use six blocks, four blankets, two bolsters, one strap and a chair—just for one pose! (This has been my personal experience.) Such bounty may not be available to you, so the practice offered here relies on fewer props, if any, and resembles a yin yoga practice, which has distinct characteristics. But if possible, invest in a hearty set of yoga props (see “Typical Restorative Yoga Props,” left).



SINCE RESTORATIVE YOGA IS MEDITATIVE IN NATURE, IT GIVES THE PRACTITIONER AN EXPERIENCE OF PHYSICAL CALM AND FOSTERS THE RELEASE OF DEEPLY HELD TENSION IN THE BODY. THIS REDUCES THE DEVELOPMENT OF SECONDARY, STRESS-RELATED PROBLEMS OVER TIME.



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# Sample Restorative Yoga Practice

The following sequence is an option when only a few props are available. Remember that a true restorative yoga practice relies heavily on the use of props to assist the body's ability to truly let go.

## Props:

- one large rectangular or round bolster
- three yoga blocks
- one to two blankets
- one eye pillow/cover

A yoga block can be placed at three different heights. These positions are referred to as tall, medium and short in the descriptions that follow.

## Reclining Cow Face Pose (Supine Gomukhasana)

This forward-fold variation calms the nervous system and releases tension in the glutes, piriformis, iliotibial band and lower back; also, for some, the hamstrings.

- Place folded blanket on ground, ensuring it's long enough to cushion entire torso from hips to skull.
- Place one block in tall position, with second block in medium position about 8 inches closer to blanket.
- Place bolster on blocks to create a "ramp."
- Lie down, hips on floor close to low end of ramp.
- Cross one leg over bolster, thigh extending its length, shin hanging off opposite side.
- Cross other leg in same fashion on top of first leg. Bolster is between shins.
- Cover eyes.
- Relax and breathe deeply for 2–3 minutes, then switch orientation of legs for additional 2–3 minutes.

**Bare-bones variation:** Lie on back with hips about 18 inches from wall, knees bent and feet flat on wall, hip-distance apart. Cross one ankle over opposite knee in figure-four orientation. Hold for 2–3 minutes and then switch sides.

## Reclining Butterfly Pose (Supta Baddha Konasana)

This pose releases tension in the pelvic floor, adductors and lower abdominals and provides a gentle backbend to counter the repetitive flexion found in many weight-bearing exercises.

- Place block in low position and lay bolster on top of it so you have a long ramp.
- Sit on folded blanket, bolster behind you, hips touching bolster's edge.
- Bend knees, bringing soles of feet together. Allow thighs to drop open to sides. Place block or blanket under each knee or thigh. Focus on support, not on deep stretching.
- Gently lie back onto bolster ramp, resting arms where comfortable.
- Cover eyes and breathe easily for 3–5 minutes.

**Bare-bones variation:** Lie on back, legs up wall. Bend knees, bringing soles of feet together so legs form diamond shape. Rest for about 3 minutes.

## Reclining Legs Up the Wall Variation (Viparita Karani Variation)

This pose relieves tension in the lower back, glutes, hip flexors, quadriceps, upper body and abdominals. It also reduces fatigue in the legs.

- Lie on folded blanket so entire torso is supported, from hips to skull.
- Place calves hip-distance apart on bench or chair, with knees bent about 90 degrees. Position knees over or just in front of hips. Stack additional mats under torso if bench is too high or on top of bench if it is too low.
- Allow legs to soften and thighs to roll out naturally.
- Give permission for whole body to relax, breathe and rest for 3 minutes. Take your time getting up when finished.

**Bare-bones variation:** Lie on floor and place legs straight up wall. This requires more core action to stabilize posture but still offers plenty of benefit.



**Supine  
Gomukhasana**



**Supta Baddha  
Konasana**



**Viparita  
Karani**

## Slowing Down

One thing the COVID-19 experience has brought into full focus is the need to slow down, nurture and care for ourselves and others. Part of that is learning how to better regulate our nervous systems, especially during times of uncertainty and unrest. Yoga already offers numerous "keys" to soothe our minds and bodies, including breath work, mindful movement and, in the case of restorative yoga, deep rest. It is this deep rest that leads to a deep reset and better health and happiness.



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BY TONY NUÑEZ, PHD

## WHAT'S THE LATEST ON METABOLIC FLEXIBILITY, REPETITION DURATION AND MUSCLE MASS, AND THE BEST SPRINT TRAINING PROTOCOL?

### WHAT TYPES OF EXERCISE PROGRAMS ARE OPTIMAL FOR METABOLIC FLEXIBILITY AND FAT OXIDATION?

Metabolic flexibility is the body's ability to adapt calorie burn and energy source to energy availability and physical activity. The human body is highly adapted to burn carbohydrates, but fat oxidation (the breakdown of fat for energy) is secondary. It's been established that physical activity improves metabolic flexibility and fat oxidation; however, guidelines for reaching these outcomes have yet to be established.

Seventy-one sedentary adults (37 women) age  $53.5 \pm 4.9$  years completed a 12-week randomized controlled trial comparing three different interventions. One group (PAR) exercised using current physical activity recommendations (aerobic: 150 minutes per week at 60%–65% of heart rate reserve; resistance: 60 minutes per week at 40%–50% of one-repetition maximum). The second group (HIIT) performed high-intensity interval training and body-weight circuit training on separate days (40–65 minutes at  $< 95\%$  of  $\text{VO}_2\text{max}$  and rating of perceived exertion between 6 and 9 [out of 10], respectively). The last group (HIIT+EMS) performed the same intervention as the HIIT group with the inclusion of electromyostimulation training to generate muscular contraction through electrical device stimulation.

Following the interventions, there was no change or difference in resting metabolic rate or fat oxidation in any group. There was a significant improvement in maximal fat oxidation during exercise for all groups relative to the nonintervention control group, with the HIIT+EMS group seeing the largest improvement.

**REFERENCE:** Amaro-Gahete, F.J., et al. 2020. Metabolic rate in sedentary adults, following different exercise training interventions: The FIT-AGEING randomized controlled trial. *Clinical Nutrition*, in press.

### WHAT ARE THE EFFECTS OF REPETITION DURATION AND NUMBER OF MUSCLE ACTIONS ON MUSCLE MASS IN TRAINED MEN AND WOMEN?

Muscular hypertrophy is a common goal in resistance training, yet there are still questions regarding what type of program is best for this purpose. Eccentric-emphasis training (less than 2 seconds of eccentric action) has grown in popularity for its ability to elicit large increases in muscle size. Time-under-load (TUL) training has also received attention for demonstrating similarly significant improvements.

Carlson and colleagues employed three different training programs to test these methods, each performed to momentary fatigue by participants 2 days per week for 10 weeks. Programs were as follows: 2-second concentric, 4-second eccentric (2s:4s); 10-second concentric, 10-second eccentric (10s:10s); and 30-second concentric, 30-second eccentric (30s:30s:30s). Total repetitions and TUL were 8–12 reps and 56–84 seconds for 2s:4s; 3–5 reps and 60–90 seconds for 10s:10s; and 1.5 reps and

90 seconds for 30s:30s:30s. The participants, average age 40, had engaged in regular resistance training prior to the study.

All programs improved strength after 10 weeks, with no difference in muscle mass occurring among groups; 10s:10s elicited the lowest level of strength improvement, though the difference was not statistically significant. Surprisingly, single-set 30s:30s:30s displayed improvements in strength and muscle size comparable to the single-set 2s:4s protocol.

**REFERENCE:** Carlson, L., et al. 2019. Neither repetition duration nor number of muscle actions affect strength increases, body composition, muscle size, or fasted blood glucose in trained males and females. *Applied Physiology, Nutrition, and Metabolism*, 44 (2), 200–07.

### WHAT'S THE BEST SPRINT TRAINING PROTOCOL FOR IMPROVING AEROBIC AND ANAEROBIC POWER?

Improvement in anaerobic power (ability to produce energy for high-intensity exercise at fast rates) is a function of exercise intensity, whereas improvement in aerobic power ( $\text{VO}_2\text{max}$ ) is a function of exercise intensity and duration. A new study investigated the effectiveness of uphill, downhill and flat-surface sprint training—a traditionally anaerobic program—in improving both anaerobic and aerobic power.

Each of 27 recreationally active males with an average age of 20 took part in one of four sprint training scenarios, with an additional seven men serving as a control group. The sprint groups were EXP1: a 20-meter uphill sprint with a 15-meter flat-surface sprint; EXP2: a 20-meter downhill sprint with a 15-meter flat-surface sprint; EXP3: a 20-meter uphill sprint with a 15-meter flat-surface sprint and a 20-meter downhill sprint; and EXP4: a 25-meter flat-surface sprint. These programs were performed three times a week for 8 weeks and followed principles of progressive overload, although the EXP3 protocol was performed for fewer sets and included more recovery time. Participants took part in 2 weeks of resistance training prior to the study.

After 8 weeks, only two of the four (EXP1 and EXP3) programs had improved anaerobic power. While all sprint training protocols enhanced aerobic power regardless of slope condition, the combination of up- and downhill sprint training yielded the biggest improvement in aerobic power.

**REFERENCE:** Hindistan, E., et al. 2020. Effects of sprint interval training on sloping surfaces on aerobic and anaerobic power. *Biomedical Human Kinetics*, 12 (1), 41–50.



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