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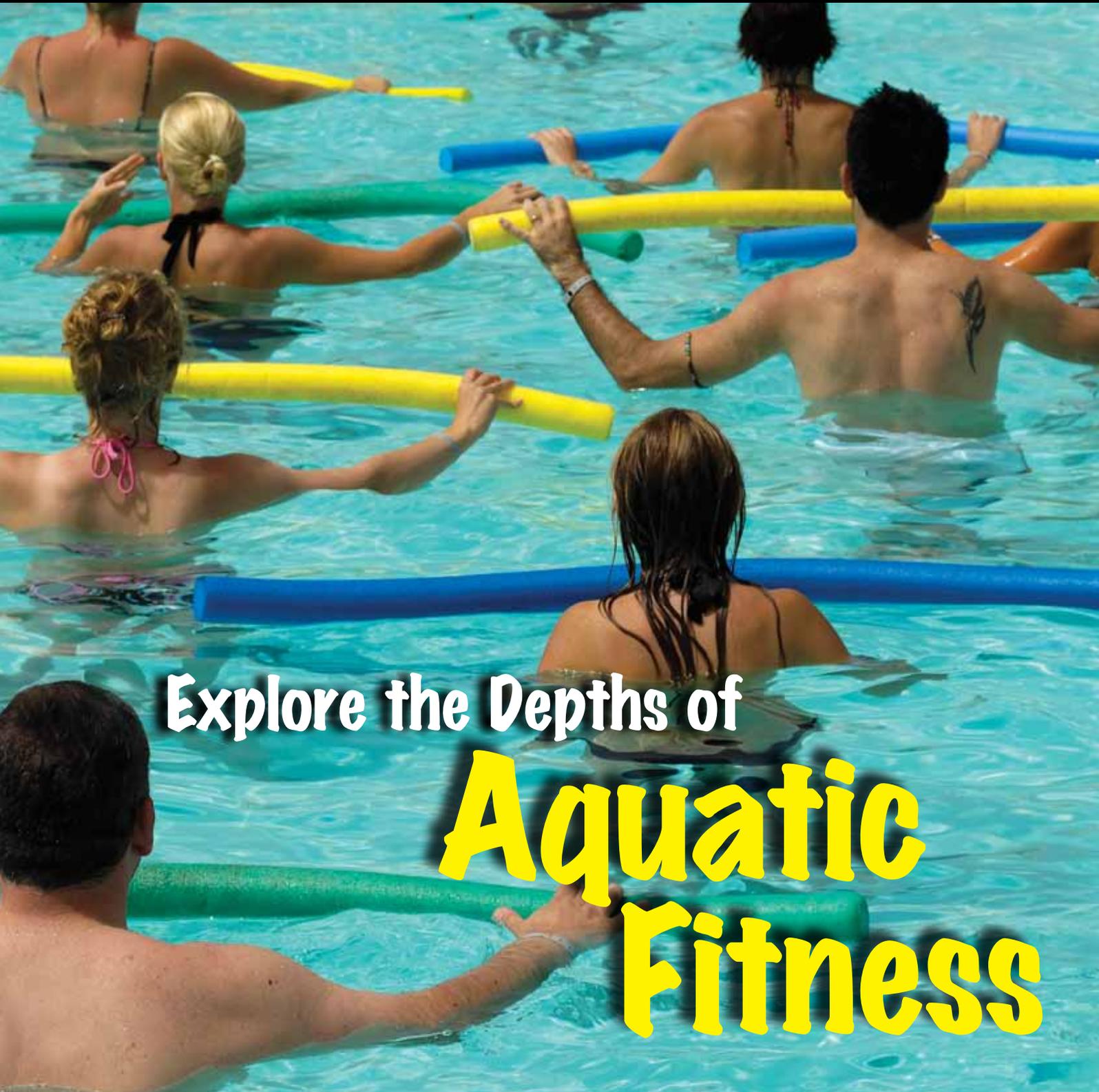
Volume 15

Issue 5

August/September 2009

AMERICAN COUNCIL ON EXERCISE

A NON-PROFIT ORGANIZATION



Explore the Depths of

Aquatic Fitness



7

HOW TO DESIGN A LACTATE THRESHOLD TRAINING PROGRAM

3

Research confirms that lactate threshold training is an effect way to enhance endurance performance. Here's what you need to know—and what questions you must answer—before you start designing training programs for your clients.

TAKE ADVANTAGE OF THE VERSATILITY AND CONVENIENCE OF THE CABLE CROSSOVER

7

One of the most versatile pieces of gym equipment is also the most underutilized—the cable crossover machine.

GFI SERIES: EXPLORE THE DEPTHS OF AQUATIC FITNESS

11

Chris Freytag details the benefits of water exercise and explains why this often-maligned modality can provide participants with a high-intensity workout that increases flexibility, muscular strength and endurance without stressing the joints.

GET YOUR GRAVITY ON

14

As a fitness professional, you're always looking for ways to expand your personal training business, especially in today's tough economic climate. While the options are endless, one in particular might be worth your attention now: Becoming a Gravity System instructor.

LETTERS TO THE EDITOR

17

Read the passionate responses of *ACE Certified News* readers to last issue's article on creating safe and effective indoor cycling classes.

TABLE OF CONTENTS



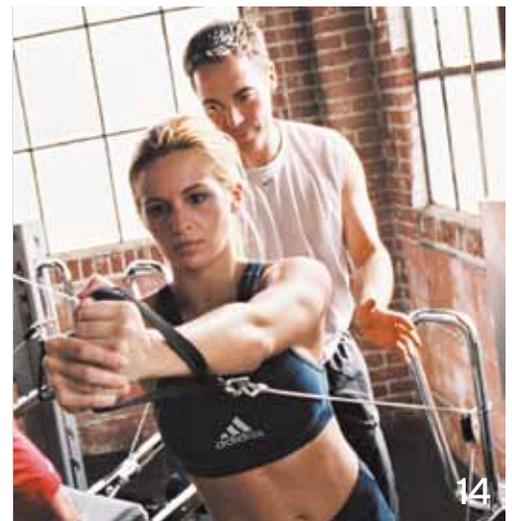
11

KEEPING YOU POSTED 18

- New Program for Military Spouses
- ConEd Spotlight
- ACE in the News
- New ACE Apparel Now Available

CALENDAR OF EVENTS 22

CEC QUIZ 23



14

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How to Design a LACTATE THRESHOLD TRAINING PROGRAM

MANY OF YOUR CLIENTS MAY NOW BE COMPETING RECREATIONALLY IN ENDURANCE EVENTS, SUCH AS MINI-TRIATHLONS, TRIATHLONS, DUATHLONS (RUNNING AND CYCLING), HALF-MARATHONS AND MARATHONS. SOME CLIENTS WILL SEEK YOUR TRAINING EXPERTISE TO HELP THEM ATTAIN THE MOST POSITIVE OF OUTCOMES.

BY
LANCE C. DALLECK, Ph.D., & LEN KRAVITZ, Ph.D.

From the research, it is apparent that lactate threshold training is a well-established system to enhance endurance performance. However, before you start designing individual training programs, a few questions must first be answered, such as 1) What are the frequency, intensity, time and type (F.I.T.T) recommendations for lactate threshold training? And 2) How should lactate threshold training be progressed? Questions such as these encourage fitness professionals to use an evidence-based practice to guide program development. Evidence-based practice is the integration of the best research evidence with professional expertise and client values (Straus et al., 2005). This article will use this approach in designing an exercise program that will optimize lactate threshold training.

Lactate Threshold Defined

The lactate threshold (LT) is the fastest a person can continuously run, cycle, swim or aerobically exercise in a steady state bout without fatiguing. Increased intensity of training

just above the LT results in an abrupt increase in blood lactate levels. At rest and under steady-state exercise conditions, there is a balance between lactate production and removal, as lactate can be used as substrate (fuel) by the heart, liver and muscles (Brooks, 2000). Thus, the LT represents the point at which a disruption begins in the equilibrium between blood lactate production and blood lactate removal. Although actual measurement of the LT is completed with an incremental exercise test in an exercise physiology laboratory, the sidebar below, "Assessing and Tracking the LT," presents a validated field test for estimating and tracking improvement in the LT.

Continued on page 4

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Assessing and Tracking the LT

McGehee and colleagues (2005) have validated a user-friendly LT assessment field method with a 30-minute running (or speed walking) exercise bout. Initially, have the client do a five- to 10-minute low-intensity warm-up. Then, have the client run (or speed walk) as fast he or she can for 30 minutes at a 1% grade. The average running speed is deemed the LT (in speed), while the average HR (collected every five minutes) during the 30-minute test is the HR at LT. Have the client repeat this field test every few months to track progress. Your expectations are that the client will increase his or her running speed while exercising at the same (or similar) HR intensity, thus confirming improvements in LT.

How is lactate produced?

Through the process of glycolysis (which means the splitting of sugar), blood glucose or muscle glycogen is converted to pyruvate, which will either enter the mitochondria (energy factory of the cell) or be converted to lactate depending on the intensity of exercise. Pyruvate enters the mitochondria at exercise intensity levels below the LT; at intensity levels above LT the capacity for mitochondrial respiration (the complete breakdown of carbohydrate) is exceeded and pyruvate is converted to lactate. Lactate production should not be viewed as a negative metabolic event, but as a consequence occurring during high-intensity exercise. Also, with this increasing exercise intensity there is a shift toward the recruitment of more fast-twitch muscles, which have metabolic characteristics that are geared toward glycolysis.

How does training affect lactate production?

Reduced lactate production at the same given workload following endurance training can be attributed to increased mitochondria size, numbers and enzymes. Both mitochondria size and number have been reported to increase within endurance-trained individuals by 50 percent to 100 percent, which results in an improved capacity for mitochondrial respiration (Holloszy and Coyle, 1984). Furthermore, there is an increase in several of the key enzymes (catalysts to metabolic reactions) involved in mitochondrial respiration following endurance training (Honig, Connett and Gayeski, 1992). The combined result of these training adaptations enhances the muscle cell's ability to generate energy through mitochondrial respiration, and thus lowers the amount of lactate production from glycolysis.

How does training affect lactate removal?

Endurance training appears to cause an increase in lactate utilization by muscles, which results in an improved ability to remove lactate from the circulation (Gladden, 2000). It has been suggested that part of the reason slow-twitch muscles are more resistant to fatigue is that they contain more lactate and hydrogen ion transporters (into the mitochondria) than fast-twitch muscles (Brooks, 2000). Hydrogen ion accumulation is now considered to be the cause of acidosis (Robergs, Ghiasvand and Parker, 2004). Thus, slow-twitch muscles have a greater capacity for clearing lactate and hydrogen ions than do fast-twitch muscles. Training also has been known to improve capillarization in and around the muscles, especially the slow-twitch muscles. This adaptation functions to improve blood flow to and from exercising muscles, which also enhances the clearance of lactate and hydrogen ions.

Developing a Lactate Threshold Training Program

Now, with the understanding of the lactate threshold and the production and removal of lactate, let's return to the evidence-based approach in designing an exercise program that will optimize LT training.

Step 1: Gather the background research on lactate threshold training.

Although maximal oxygen uptake ($\dot{V}O_{2max}$) has been viewed as a key component to success in prolonged exercise activities, most researchers agree that the LT is the best and most consistent predictor of performance in endurance events (Londeree, 1997). When considering the optimal LT training program, the following questions must first be answered:

1. What are the F.I.T.T. recommendations for lactate threshold training?
2. Do these recommendations differ between untrained and trained individuals?
3. What type of workout best modifies lactate threshold (steady state or interval)?
4. How should lactate threshold training be progressed?

Step 2: Where is the best evidence to answer these four questions?

A central pillar of evidence-based practice is to identify and employ the best evidence available to answer the questions pertaining to the optimal LT training program compiled in Step 1. The quality of evidence may range from research findings derived from multiple randomized, controlled studies (the most powerful form of evidence) to those resulting from personal expertise (the least attractive type of evidence). Two review articles published in high-impact factor (highly esteemed via research standards), peer-reviewed publications on the topic of LT training were the primary sources of evidence used to address our questions for this article (Londeree, 1997; Midgley, McNaughton and Jones 2007). Importantly, review articles summarize findings across a number of scientifically rigorous studies and provide the overall 'state of knowledge' on a specific topic.

1. What are the F.I.T.T. recommendations for lactate threshold training?

The general F.I.T.T. approach to exercise programming used for cardiorespiratory fitness-program design can also be applied to LT programming (ACSM, 2006). Two types of specialized LT workouts identified in the literature include steady-state LT exercise bouts and high-intensity interval training (above the LT) sessions. The F.I.T.T. recommendations for each form of training, along with several modifications, are presented in Tables 1 and 2, respectively.

TABLE 1.

PROGRAM COMPONENTS FOR STEADY-STATE LACTATE THRESHOLD TRAINING

PROGRAM COMPONENT	PROGRAM MODIFICATION
Exercise Mode:	No single modality appears to be best for steady-state, LT training LT adaptations resultant to steady-state training are specific to training mode. Exercise sessions should be designed to closely match client's performance goals (e.g., if client intends to participate in a triathlon, steady-state sessions should involve running, cycling, and swimming)
Exercise Intensity:	Workouts should be performed at velocities or workloads associated with LT % $\dot{V}O_{2max}$ at LT will vary depending on client training status RPE values of 14–15 (6 to 20 scale) are closely associated with blood LT and can be used to accurately establish exercise intensity for steady-state workouts
Exercise Session Duration:	20–30 min per steady-state, LT training session Duration of session should be appropriate for client goals
Exercise Frequency:	One steady-state, LT training session per week

TABLE 2.
PROGRAM COMPONENTS FOR HIGH-INTENSITY INTERVAL
LACTATE THRESHOLD TRAINING

PROGRAM COMPONENT	PROGRAM MODIFICATION
Exercise Mode:	<p>No single modality is best for high-intensity interval-training sessions</p> <p>Multiple modalities will be equally effective for high-intensity interval training. Various exercise modalities may be employed (e.g., treadmill, elliptical, cycling) throughout the interval-training program to promote adherence</p>
Exercise Intensity:	<p>Workouts should be performed at velocities or workloads associated with $\dot{V}O_2$max</p> <p>90–100% heart-rate reserve (HRR) or oxygen uptake reserve; 95–100% maximal heart rate</p> <p>RPE values of 17–20 (6 to 20 scale) are closely associated with 90–100% maximal workload and can be used to accurately monitor exercise intensity for interval-training sessions</p>
Exercise Session Duration:	<p>6–10 repetitions of 2–3 min work intervals alternating with 2–3 min recovery intervals</p> <p>Interval repetitions can begin with two per session (work 3 min/recover 3 min and then repeat) and progress by one interval (work/recovery) repetition each week</p>
Exercise Frequency:	One high-intensity interval session per week

2. Do these recommendations differ between untrained and trained individuals?

The training status (along with age, body weight and training time) will suggest individual modifications in all aspects of F.I.T.T with trained versus untrained clients, but the LT approach is the same. Initially, the best way to improve LT levels is to simply increase the client's training volume (i.e., distance, time and/or frequency) whether their endurance activity involves cycling, the elliptical crosstrainer or swimming. The premier benefit of increased training volume will be increased capacity for mitochondrial respiration. Training intensity during this phase should fall within the moderate-intensity range recommended by the ACSM of 40 percent to 60 percent of heart-rate reserve (HRR).

3. What type of workout best modifies the LT (steady-state or interval)?

Both are critical for the continued improvement of the LT. It is the timing for when these specialized workouts should be implemented into a client's training program that is most important. Research has shown that the addition of steady-state workouts performed at the LT to an existing aerobic exercise routine in previously active participants results in improved LT levels (Midgley, McNaughton and Jones 2007). For highly endurance-trained clients, or those who have been performing steady-state workouts for some time, interval training sessions must be integrated into training programs to facilitate continued improvement of the LT.

Is the Ventilatory Threshold the Same as the Lactate Threshold?

Ventilatory threshold refers to the exercise intensity at which there is a rapid increase in ventilation. The abrupt rise in ventilation coincides with the development of metabolic acidosis, which is characterized by elevated hydrogen ion (H⁺) concentrations. Expectedly, ventilation rises to dispose of the excess carbon dioxide being produced apart from metabolism through the buffering (or neutralizing effect by the compound bicarbonate) of the increasing H⁺ concentration. Because increased ventilation occurs with increasing blood H⁺ concentrations and the associated blood lactate values concentrations, it has been suggested that the ventilatory and lactate thresholds occur at comparable exercise intensities. This interpretation is attractive because determining the ventilatory threshold is non-invasive compared to the lactate threshold. Although some studies have shown similarities between the thresholds, other studies have determined that various conditions, including training status and carbohydrate nutritional supplementation, can cause the thresholds to differ substantially (Robergs and Roberts, 1997).



4. How should lactate threshold training be progressed?

A training program designed to optimize LT consists of three components: 1) base-building aerobic-training phase; 2) steady-state LT workouts; and 3) high-intensity interval sessions. The increase in training volume should be approximately 10 percent to 20 percent per week. For example, if an individual is currently running 10 miles per week, the increase in training volume should be 1 to 2 miles per week. Incorporating multiple training modalities (e.g., cycling, elliptical, rowing) into the aerobic exercise routine may also facilitate program adherence. The maximum training volume an individual attains can be best gauged by determining the overall capacity and motivation of your client. The base-building phase may be a minimum of two to three months for some individuals.

Following adequate build-up in training volume, the next training period to be addressed is steady-state, continuous LT training. The RPE scale may be the most accurate way to determine training intensity during this aspect of training (recommendations are listed in Table 1). Research has shown that RPE is strongly related to the blood lactate response to exercise regardless of gender, training status, type of exercise being performed or the intensity of training (Weltman, 1995). This is noteworthy, as other methods of monitoring intensity at the LT have been known to have serious flaws in methodology, which result in underestimating or overestimating training intensity. Similar to the timeline increase in training volume, steady-state workout sessions can be increased in duration from a starting point of 10 minutes by 10 percent to 20 percent per week. Evidence suggests that steady-state sessions of 30 minutes in duration are sufficient for optimizing the improvement in LT of most clients during this phase of training (Londeree, 1997; Midgley, McNaughton and Jones 2007). The progression from 10- to 30-minute steady-state LT workouts may be accomplished gradually over several weeks.

High-intensity interval sessions are the last piece of the LT training puzzle. These specialized workouts should only be incorporated after first completing a proper base-building phase and steady-state LT workouts. Interval workouts are high-intensity training sessions performed for short durations at velocities or workloads near or at maximal capacity (90–100% HRR). Evidence suggests that the proper duration of these interval work bouts range from two to three minutes with similar amounts of time for recovery between bouts. Progress gradually with the total number of repetitions (high-intensity bout followed by low-to-moderate intensity recovery bout) consisting of between five and 10 interval repetitions depending on training status, type of endurance-activity being performed, and distance of endurance activity. The key to successful steady-state and interval training is careful monitoring of intensity to prevent your client from overtraining.

Step 3: Implement the lactate threshold training program.

Table 3 is a case study that shows how a LT program can be implemented. Note the ease of use with multiple modes of this program.

Continued on page 24

TABLE 3.
LACTATE THRESHOLD TRAINING PROGRAM CASE STUDY

Client background and goals: Angie, 32, ran cross-country in high school, but has been mostly sedentary the past 10 years while raising her three children. She wants to do a duathlon (running and biking) as part of her 'NEW ME' resolution and would like you to design a LT training program for the upcoming event. Angie has no previous injuries or health conditions. She can commit to training five days per week for an hour each day. She has access to a recumbent bike and an elliptical crosstrainer, and can also run outside.

Phase 1: Aerobic base-building (weeks 1–12)

Because Angie has previously been sedentary, three months of moderate-intensity aerobic training is recommended to create a foundation for this LT program. The progression plan for this phase of the program is as follows*:

Week	Frequency	Intensity	Time
1	3	40–50% HRR	15
2	3	40–50% HRR	20
3	4	40–50% HRR	20
4	4	40–50% HRR	25
5	4	40–50% HRR	30
6	4	40–50% HRR	35
7	5	40–60% HRR	35
8	5	40–60% HRR	40
9	5	40–60% HRR	45
10	5	40–60% HRR	50
11	5	40–60% HRR	55
12	5	40–60% HRR	60

* Exercise mode during this phase rotates daily between biking, elliptical crosstrainer and running. Angie is encouraged to bike and run outside one day per week to mimic the demands of the duathlon.

Phase 2: Steady-state, lactate threshold training (weeks 13–18)

- Substitute one day of moderate-intensity aerobic training with steady-state LT workout
- Duration of bouts begin at 15 minutes and increase by three minutes per week at RPE of 14–15
- Alternate steady-state workout session between cycling and running from week to week
- Continue with moderate-intensity aerobic exercise on other four days

Phase 3: Interval training (weeks 19–24)

- Replace steady-state workouts with high-intensity interval sessions
- Perform 4 X 3-minute work bouts at 90–100% HRR (RPE 17–20) with 3-minute recovery bouts (40–60% HRR); add one interval (work/recovery) repetition/week
- Alternate interval sessions between cycling and running from week to week
- Continue with moderate-intensity aerobic exercise on other four days

Take Advantage of the Versatility and Convenience of the

BY
CARRIE
MYERS

Cable Crossover

WHEN IT COMES TO DESIGNING EXERCISE PROGRAMS, IT CAN BE TEMPTING TO DITCH OLD STANDBYS FOR THE LATEST AND GREATEST GADGETS. BUT IT WOULD BE A MISTAKE TO LET YOUR ENTHUSIASM FOR NEW TECHNOLOGY CAUSE YOU TO TURN YOUR BACK ON SOME OF THE TRIED-AND-TRUE STAPLES OF THE GYM. TAKE THE CABLE CROSSOVER, FOR INSTANCE. IT IS ONE OF THE MOST VERSATILE PIECES OF EQUIPMENT AND YET ONE OF THE MOST UNDERUTILIZED. HERE WE SHOW YOU HOW YOU CAN GIVE YOUR CLIENTS A FULL-BODY WORKOUT ON THIS ONE PIECE OF EQUIPMENT AND ADD TO YOUR CATALOG OF EXERCISES.

Get Creative!

The fun really begins when you combine the cable crossover with other functional gear, like the BOSU® or stability balls. For instance, add a BOSU® to any of the standing exercises, or try kneeling on it for the Kneeling Cable Crunches. Here is one more variation:



Cable Squats on the BOSU Ball®

Attachment: *Single cable handles*

Attach a handle to the lowest position on each side of the machine. Place a BOSU Ball® in the center of the machine. Hold a handle in each hand while standing on the ball. Perform eight to 12 squats on the ball. Pay special attention to technique since the ball will decrease stability: feet parallel to the floor about shoulder-width apart, pull up through the abdominals and press back through the glutes while squatting down.



Lower Body

Attachment: All of the lower-body exercises require the ankle cuff attachment, attached to the lowest position.

Hip Flexion/Leg Extension

Stand with your back to the weight stack, feet shoulder-width apart and right leg extended back slightly (starting position). Lift the knee up so that you have 90 degrees at both hip and knee. Extend the leg, then flex the knee back to 90 degrees and lower the leg to the starting position. Avoid leaning backward or flexing forward during the movement. Complete eight to 12 repetitions and repeat on the left side.



TIP: To save time, do all of the lower-body exercises on one leg first and then switch sides.

Continued on page 8

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Lower Body (continued)

Leg Curl

Stand facing the weight stack. Take a step back and lean forward to hold onto the machine frame. Extend the right leg back slightly (starting position). Flex the knee, pulling the heel toward the glutes. Slowly return to the starting position. Complete eight to 12 repetitions and repeat on the other side.



Hip Extension

Stand in the same starting position as the Leg Curl. Extend the right leg up from the hip, focusing on contracting the glutes. Return to starting position and complete eight to 12 repetitions. Repeat on the left side.



TIP: Pay attention to posture throughout all these exercises. Remind clients to stay strong through their centers and contract their core muscles.

TIP: Use a pole or Body Bar® to help stabilize the body and maintain good posture while performing some of these lower-body exercises.

Abduction

Stand with your right side to the weight stack, cuff attached to the left ankle, feet about shoulder-width apart (starting position). Abduct the hip by lifting the leg out to the side, then slowly lower to the starting position. Complete eight to 12 repetitions and repeat with the right leg.



Adduction

Stand with your right side to the weight stack, cuff attached to the right leg, feet about shoulder-width apart (starting position). Adduct the right leg and pull the leg past midline. Return to the starting position and complete eight to 12 repetitions. Repeat with the left leg.



Upper Body

Cable Fly

Attachment: Single cable handles

Attach handles to one of the highest positions on the machine, one on each side. Grab a handle in each hand and stand in the center of the machine in a staggered stance position, leaning slightly forward. Hold arms up to about shoulder height, palms facing inward (starting position). Adduct the arms, pulling them down, meeting at the body's midline. Slowly return to the starting position and repeat for eight to 12 repetitions.



TIP: Remind clients to engage the core muscles and keep the wrists strong and in line with the rest of the arm throughout the movement. Also remind them to focus on the pectorals and squeeze the muscles together while pulling the handles down.

BONUS EXERCISE:

Cable Fly with Bench or Ball

Place a bench or stability ball in the center of the machine. Attach the handles to a position about level or slightly above the bench or ball. Lie supine on the bench or ball, holding a handle in each hand, arms extended, elbows slightly bent (starting position). Pull the arms up so that the handles meet at the midline just above the chest. Slowly return to the starting position and repeat for eight to 12 repetitions.

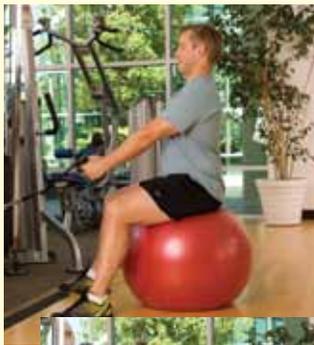
Seated Row

Attachment: Straight bar, triceps rope or triangle bar

Place the attachment on a low position. Sit on the floor facing the weight stack, legs extended (some people will find it more comfortable to keep the knees flexed). Sit tall, contracting the abdominals and holding the attachment, arms extended out front (starting position). Pull the arms back, keeping them close to the body, until your hands are at your sides. Slowly return to the starting position and repeat for eight to 12 repetitions.

OPTIONS: Sit on a BOSU ball, stability ball or bench instead of the floor. Adjust the attachment position as necessary.

TIP: As the arms are pulled back, instruct clients to think about squeezing the shoulder blades together. To help them really understand this concept, place your finger on their spine and tell them to squeeze your finger.



BONUS EXERCISES:

One-Arm Row

The seated row can also be done with one arm at a time. Place a single cable handle to a low position. Stand facing the weight stack in a lunge position, left leg forward. Hold the handle in your right hand, right arm extended; rest the left arm on your left leg (starting position). Pull the right arm back, bending the elbow and keeping the arm close to the body. Slowly return to the starting position and complete eight to 12 repetitions. Repeat on the left side.

Lat Pull-down

Attachment: Straight bar

Attach the bar to the highest position. Sit on a stability ball, holding the bar overhead. Lean back slightly while contracting the abdominals (starting position). Pull the bar down to about chest level and slowly return to the starting position. Repeat for eight to 12 repetitions.

Lateral Raise

Attachment:
Single cable handle

Place attachment at the lowest position. Stand with your right side to the weight stack, feet about shoulder-width apart and weight evenly distributed over both feet. Hold the attachment in your left hand, with your hand at the right hip (starting position). Keeping elbow slightly bent, abduct the arm up to shoulder height and slowly lower to the starting position. Complete eight to 12 repetitions and then repeat on the left side.

OPTION: This exercise can be done using both arms at once by attaching two handles, one on each side of the machine.



TIP: Focus on initiating the movement from the shoulder rather than the elbow.

BONUS EXERCISE:

Upright Row

Attach the straight bar to the lowest position. Stand facing the weight stack, feet about shoulder-width apart, and hold the bar in front of the thighs (starting position). Pull the bar straight up the body to about chest to chin height, keeping the elbows up and out to the sides. Slowly lower the bar to the starting position and repeat for eight to 12 repetitions.

TIP: Keep the shoulders down and avoid shrugging them.

Triceps Pull-down

Attachment: Triceps rope

Attach the rope to the highest position. Stand facing the weight stack, feet about shoulder-width apart or closer. Hold an end of the rope in each hand. Lean forward slightly with knees bent and core muscles contracted. Pull the rope down and “glue” the upper arms and elbows to your sides (starting position). As you pull the rope down, separate it, bending only from the elbows. Slowly return to the starting position and repeat for eight to 12 repetitions.

Option: Use a straight bar.



TIP: Many people tend to use their shoulders to move the weight for both the triceps pull-down and the overhead cable press. Make sure the movement is only from the elbows.

BONUS EXERCISE:

Overhead Cable Press

Attachment: Triceps rope

Attach the rope to the highest position. Stand with your back to the weight stack in a semi-lunge position. Hold the rope overhead, one end in each hand, hands slightly behind the head and elbows up (starting position). Pull the rope forward, flexing only the elbows while engaging the core to stabilize the low back. Slowly return to the starting position and repeat for eight to 12 repetitions.

Continued on page 10

Upper Body (continued)

Biceps Curls

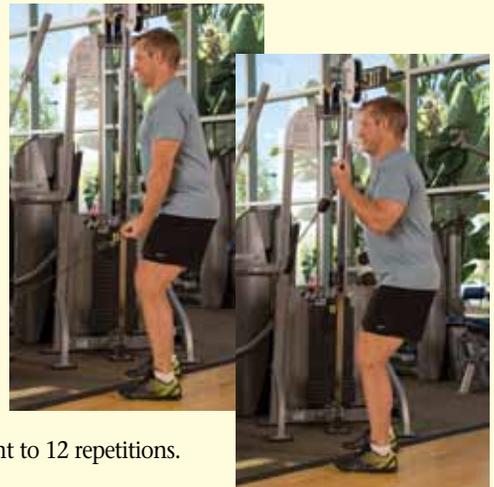
Attachment: Curling bar or straight bar

Attach the bar to the lowest position. Stand facing the weight stack, feet about shoulder-width apart and knees slightly bent. Rest the bar on the thighs and “glue” elbows to sides (starting position). Pull bar toward the chest and slowly lower back to the starting position. Avoid flexing the wrists. Repeat for eight to 12 repetitions.

BONUS EXERCISE: Lateral Biceps Curls

Attachment: Single cable handles

Attach handles to each side of the machine at about shoulder-height. Stand in the center of the machine, holding a handle in each hand with arms extended out (starting position). Flexing just the elbow, pull the handles to the shoulders and then return to the starting position. Repeat for eight to 12 repetitions.



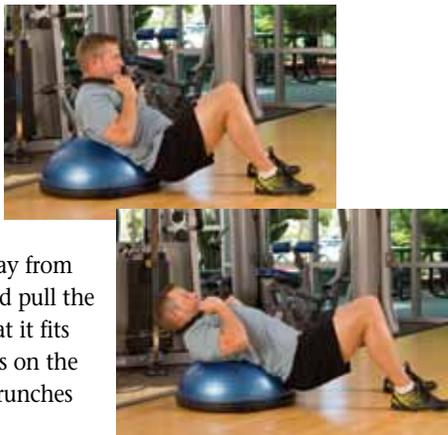
Core

Crunches with BOSU

Attachment: Triceps rope

Attach the rope to the lowest position and place the BOSU several feet from the weight stack.

Lie supine on the BOSU facing away from the weight stack. Reach behind and pull the rope, one end in each hand, so that it fits snugly under the head; rest hands on the upper chest. Perform eight to 12 crunches from this position.



Kneeling Crunches

Attachment: Triceps rope

Attach the rope to a higher position. Face the weight stack and hold an end of the rope in each hand. Kneel in front of the weight stack and hold the rope stationary, wrists on the sides of the head (starting position). Contract the abdominals and flex the torso forward. Slowly return to the starting position, holding the contraction throughout the entire movement. Repeat for eight to 12 repetitions.



Standing Diagonal Knee Lifts

Attachment: Ankle cuff

Attach the cuff to the lowest position and to the right ankle. Stand in the center of the machine, right side facing the weight stack, and left hand alongside the head. Shift weight to the left leg while keeping the knee slightly bent. Slightly abduct the right leg (starting position). Pull the right knee in and up toward the left shoulder while slightly flexing the trunk, keeping the abdominals contracted throughout the entire movement. Slowly return to the starting position and repeat for eight to 12 repetitions. Repeat on the other side.

Chops

Attachment: Single cable handle

Attach the handle to a higher position. Stand in the center of the machine, right side facing the weight stack, feet at least shoulder-width apart. Rotate the hips and torso toward the machine. Grab the handle with both hands, holding it up over the right shoulder (starting position). Pivot the feet and pull the handle down toward the left hip, rotating hips and torso, keeping the abdominals contracted throughout the entire movement. Slowly return to the starting position and repeat for eight to 12 repetitions. Switch sides and repeat.

Options: This exercise can be done from any of the positions, from high to low and in between. You can also move forward, in front of the machine (but still in the center of it) and kneel throughout the exercises. Changing it up like this will call upon the core muscles in different ways, recruiting various muscle fibers. 



Explore the Depths of AQUATIC FITNESS

BY
CHRIS
FREYTAG

ARE YOU THE TYPE WHO LOVES AN INTENSE GROUP FITNESS CLASS, ONE THAT BURNS CALORIES, CHALLENGES YOUR MUSCLES AND LEAVES YOU SOAKED WITH SWEAT? YOU MAY BE MISSING OUT ON THE WETTEST WORKOUTS YET—TRAINING IN THE POOL. AQUATIC FITNESS CLASSES WILL INCREASE YOUR FLEXIBILITY, MUSCULAR STRENGTH AND ENDURANCE WITHOUT STRESSING YOUR JOINTS.

I was one of the disbelievers until I was “pushed” into subbing some classes and quickly became aware of two things: Aquatic exercise can be an intense workout, and even though I can teach a land class with my eyes closed, I needed some proper training to be an effective aquatic fitness instructor.

Aquatic Training is Intense

Aquatic fitness has an unfortunate reputation for being an easy workout that is most appropriate for the elderly

and those with physical limitations. However, the physical properties of water are very different from the gravity experienced during land-based training, which makes many water workouts feel deceptively easier than they actually are. In fact, it is those exact properties, specifically buoyancy and resistance, which can turn a water workout into an intense fitness experience.

And yet after two decades of teaching group fitness classes, I still hear the same excuses why members and instructors alike discount water exercise as an intense and effective way to train. Hoping to better answer these objections, I consulted with aquatic fitness expert Irene McCormick, M.S., a veteran ACE-certified Personal Trainer and Group Fitness Instructor, and a national presenter of water classes, to learn more about the benefits of water exercise. According to Irene, all the usual objections to giving aquatic exercise a try are, in her words, “easily overcome.”

CHRIS FREYTAG is the author of *Move to Lose* and is the fitness expert and a contributing editor for *Prevention* magazine. She is ACE certified and a member of the ACE Board of Directors, a master trainer for SPRI Products and the creator of numerous fitness DVDs including *Prevention Fitness Systems*.

Objection: I can't get my heart rate up.

"The fact is that water offers a few qualities that land does not," explains McCormick. "One is the property of hydrostatic pressure. This physics property actually lessens the stress on the cardiovascular system, which decreases resting and working heart rate." For this reason land-based exercisers who use heart rate as an intensity measure are often confused when they attempt to take their pulse in the water and find that it is not comparable to land-based exercises. The best way to measure intensity in the water is to use the Ratings of Perceived Exertion scale, or RPE.

Objection: I never get sore in the water.

"Because the primary force acting on the body in the water is buoyancy, gravity does not play nearly as big a role as it does on land," says McCormick. "We know that delayed onset muscle soreness (DOMS) is often a result of loads placed on the muscles during the eccentric phase of a dynamic muscle contraction. Because movement in the water is a result of forces against the property of buoyancy (that property of water that gives an individual a floating sensation when submerged in water), the loads on the muscles are primarily working against the muscles during the concentric



Water Gear

There is a wide variety of water exercises to choose from and an endless supply of equipment, from flotation belts to kickboards, that can offer extra stability in deep water. Resistance equipment, such as webbed gloves, medicine balls, resistance tubing and Styrofoam dumbbells, add intensity to both shallow and deep-water workouts.

Water shoes are a must for shallow water. Even though you are in the water, you are still in contact with a very hard, concrete surface. Protect your feet and improve your stability by wearing water-specific shoes.

phase of a muscle contraction. Therefore, there is quite a reduction in the DOMS that often occurs after intense exercise."

Objection: I never sweat when I am in the water.

"Not true," explains McCormick. "Another wonderful property of water is heat dissipa-

tion. Because the body is submerged in water that is between 80 and 84 degrees F (ideal general population water fitness temperature), the body is naturally cooled, and sweating to cool the body becomes unnecessary." But don't make the mistake of thinking you don't need to hydrate. You are exercising, therefore you are sweating . . . it is just not as noticeable while in the pool. Keep drinking 7 to 10 ounces of fluid for every 20 minutes of exercise in the water.

Objection: The classes are geared toward beginners.

I will personally dispel this myth after taking a deep-water class and feeling the effects for the next three days. McCormick backs me up: "Deep-water exercise is one of the most intense workouts an individual can perform. In a totally suspended environment, the exercisers have to constantly challenge core stability. The leaner you are, the more likely you will sink, so you'll have to work much harder [in the water] than on land to perform the movements. Research supports deep-water running as an excellent way to cross train and improve running times. This is very important for endurance athletes who need to train continuously, but would like to avoid overuse injuries."

Traditional Land-based Workouts Can Also Be Effective in Water

It can be easy to overlook the fact that aquatic fitness classes come in a wide range of styles and types. There are mind/body classes, as well as cardio and strength training in both shallow and deep water. I am especially a fan of mind/body classes because the water offers a soothing and relaxing environment to perform yoga and Pilates movements. And, because of the decreased stress on the joints and the gentle lift you experience when you get into the pool, water is forgiving on the body, particularly for those with physical limitations. Additionally, it should be noted that aquatic fitness is probably the best exercise modality for pregnant women. After all, the water offers a gentle lift (due to buoyancy) that takes stress off the lower back and joints, and the hydrostatic pressure decreases lower-body swelling.

So the question remains: Why don't more land instructors teach water classes? I think the answer is, at least in part, that it requires training. As I stated earlier, being



pushed into teaching a water class made it clear to me that exceptional teaching skills were necessary to be able to demonstrate the water moves on land while teaching from the pool deck. It is important to realize that land-based movement often doesn't work in the water. Because of the properties of water (e.g., buoyancy, drag, hydrostatic pressure and temperature), instructors must have a thorough understanding of what movements are appropriate for water activity.

"If you are new to water fitness instruction," says McCormick, "you need to realize that you simply cannot perform the same moves that you would on land, and expect to have a successful fitness class. Land speed is different from water speed. With the exception of running, most movements you would chose as a land instructor must be changed to accommodate the water. For example, the speed of movement has to be slower for water because it takes more time to execute the movements in water than it does on land. The physical property of buoyancy is in opposition with gravity. Therefore, you must change movements that would be effective on land to be utilized in the water differently."

The best recommendation for a new aquatic fitness instructor (even if you have years of land-based teaching experience) is to get in the pool and experiment. Try a few moves, see how they feel and try to choreograph them together. You'll likely find that executing the same moves on land will take longer in the water and will usually have to be slightly modified to meet the demands of buoyancy as opposed to gravity. Additionally, keep in mind that cues have to be big and extremely visual. This is the approach I took when first learning how to teach in the water and it helped me learn how to cue properly and work with the music.

Teaching from inside the pool requires exceptional coaching skills and an ability to move throughout the pool so that all the participants have contact with the instructor. "This takes practice, says McCormick. "Some of the issues with in-water teaching include a lack of an ability of the participants to see your body movements and hear you."

Here are a few basic tips to consider when teaching an aquatic fitness class from inside the pool:

1. Teach several moves from the deck first,

then get in the pool and perform them with your participants.

2. Try and move around the pool and make face-to face contact with as many of the participants as possible. Offer feedback on form and technique.
3. Use hand signals as well as verbal cues. Remember, many learners are visual, so even if you are yelling loud, you need to use different types of cues to include everyone in the learning process.

These tips will help get you started, but continuing education and training are essential to becoming an effective aquatic fitness instructor. McCormick and other aquatic fitness experts offer workshops and trainings at fitness conferences around the world, many of which will enable participants to earn continuing education credits. McCormick believes more group fitness instructors should consider aquatic fitness training. "Most land-based instructors can do it and it's a great way to expand your versatility," she explains. "They just need to be taught the unique skill set necessary to teach water movement so that the class is both fun and effective for almost all populations." 



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- Atlanta, GA - October 24 & 25, 2009

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GET YOUR Gravity On

YOU'VE NO DOUBT HEARD ABOUT THE GRAVITY SYSTEM. BUT WHAT IS THIS PROGRAM ALL ABOUT AND HOW CAN YOU GET INVOLVED? READ ON TO LEARN ABOUT THIS CUTTING-EDGE PROGRAM AND WHAT IT OFFERS FOR YOU.

BY
KAREN
ASP

As a fitness professional, you're always looking for ways to expand your personal training business, especially in today's tough economic climate. While the options are endless, one in particular might be worth your attention now: Becoming a Gravity System instructor. In the near future, ACE will be creating a registry of ACE-certified instructors who have taken continuing education courses through Gravity so consumers can find you, which is why it makes sense to get involved with this program sooner versus later.

If you're not familiar with the Gravity System, you undoubtedly know its famous "relative," the Total Gym. Created by efi Sports Medicine 35 years ago, the Total Gym is designed for consumers while the Gravity System is the commercial arm of the company, consisting of two pieces of equipment called the GTS and the Power Tower (which is like the GTS, but has a wireless remote control to increase or decrease the incline during an exercise).

How do they work? Like the Total Gym, Gravity equipment involves a cable-and-pulley system and a glideboard that can be inclined to various degrees. You then either sit, kneel or lie on the glideboard as you push or pull against the resistance of the incline, working the body from head to toe. Resistance, of which there are eight calibrated levels, can vary from 5 percent to 59 percent of body weight.

Yet the Gravity System, which launched almost four years ago, encompasses more than just equipment. "It's a multi-discipline program that incorporates educational programming, continuing education courses for fitness professionals and marketing support," says Tom Campanaro, CEO and founder of efi Sports Medicine. Because of these key components, the Gravity System has often been compared to the Spinning® program.

KAREN ASP, a health and fitness writer and ACE-certified fitness professional, writes regularly for numerous publications, including *Self*, *Shape*, *Women's Health*, *Fitness*, *Prevention*, *Real Simple*, *Men's Fitness*, *Woman's Day* and *Natural Health*. She's also a contributing writer for AOL and Oxygen.



Four Programs to Choose From

On the educational front, there are four program modules in the Gravity System. While all four have continuing education courses, two modules have requirements you must meet before you can go through that specific training.

GravityGroup, for instance, is a 30-minute, full-body workout that challenges both strength and cardio. GravityPersonalTraining is designed for certified or degreed personal trainers who want to run small group or semi-private training sessions. GravityPilates, on the other hand, takes traditional Pilates mat and reformer exercises and translates them to the GTS. To achieve this certificate, fitness professionals must be certified Pilates instructors. Meanwhile, GravityPost-Rehab allows instructors who have already attended the GravityPersonalTraining module and are familiar with the Gravity equipment to develop programs for individuals who are recovering from an injury or a medical condition.

Yet with all of the other equipment in the gym, you might be wondering what the unique benefits of the Gravity System are to consumers. In a nutshell, functional training. "Gravity encourages dynamic movements that enhance flexibility, stability, balance and strength," says Cedric Bryant, Ph.D., chief science officer for the American Council on Exercise. "You have more freedom of movement with the Gravity System."

Campanaro compares this type of training to the training gymnasts do in which they primarily use their body weight as resistance. "The glideboard creates an unstable environment, which recruits all of the stabilizing muscles and creates a stretching and strengthening workout similar to what gymnasts experience, yet in an environment that neutralizes orthopedic stress on the body," he says. In the end, you wind up training in all three planes of motion (sagittal, frontal and transverse).

You can also easily manipulate the amount of that resistance. As Campanaro explains, the load on a GTS includes a person's body weight along with the weight of the glide-



board and any added weights. Making small changes will then affect the load, thus increasing or decreasing the challenge to the body. It's even easy to change exercises, as you simply change body or hand positions.

Plus, the versatility allows for hundreds of exercises—there are more than 250 strength, Pilates and stretching exercises that can be performed on Gravity equipment—and if you do a circuit-training workout, you can reap aerobic benefits as well. Now add a personal trainer to that environment, and the benefits for consumers increase exponentially.

Should You Become a Gravity Instructor?

On the flip side, fitness professionals can also reap the rewards of becoming a Gravity instructor. For starters, the Gravity System can help increase your revenues by increasing your client base. “The Gravity System can accommodate a wide range of users,” Bryant says, adding that Gravity participants range from high-level athletes to older adults. And of course, because consumers are already familiar with the Total Gym—which has roughly four million users, 75 percent of whom say they're still using the product after buying it—you won't have a hard time selling them on the benefits.

Plus, the Gravity System allows you to train several people at once, even if they are at different fitness levels, says Andi Wardinsky, M.S., group fitness manager for PRO Sports Club in Bellevue, Wash., and a master trainer for Gravity. In a GravityGroup class I took recently, for instance, there were four of us, including a woman in her 20s,

another woman in her 40s and yet another woman in her 60s, all of whom had varying degrees of strength.

Wardinsky also likes the versatility of the equipment, as you can choose from hundreds of exercises when designing workout sessions for clients. You can even get creative with the exercises and add other equipment like medicine balls or the BOSU and tailor workouts to your clients' needs more closely. For instance, maybe they want to train to be faster in a specific sport. Or perhaps they're interested in increasing upper-body strength. Whatever their goals, you can use Gravity to help them get where they want to go.

And because the equipment is easy to use and requires only a few simple adjustments to make changes, you spend less time prepping for exercises. “Because prep time is decreased, you can spend more time training clients,” Wardinsky says.

Another bonus? Opportunities to teach Gravity System programs are growing. Currently, the Gravity System is located in 20 countries and more than 1,000 clubs worldwide with more than 500 clubs in the United States alone. It is also in more than 12,000 rehabilitation centers worldwide, reaching an estimated eight to 10 million patients.

Campanaro sees the rehabilitation market as the greatest area for growth in the upcoming years. “More physical therapy locations are putting in three or four GPS machines or Power Towers and running group programming for patients as well as the community,” he says, adding that those locations will be looking for qualified Gravity instructors.

Another opportunity you might consider—and one that Campanaro has seen more

fitness professionals do, especially those who have reached the top level in the club market and are ready to move on—is opening a Gravity-centric studio where the main focus is Gravity equipment and programs. It worked for one trainer whom Campanaro says opened a Gravity-focused studio with her husband, although they do have other pieces of equipment. In the first year, they paid off their investments and began making more than six figures.

Gravity Training and Support

If you're interested in becoming a Gravity instructor, head to efi's Web site (www.efisportsmedicine.com) to locate continuing education courses around the country for each of the four programs. All of the courses but GravityPost-rehab last a day and cost \$220. GravityPost-Rehab, which is offered only about twice a year, is a two-day course that costs \$399.

Whether you've taken these continuing education courses or not, you can join the online GravityClubhouse as an individual trainer, which will cost you \$15 a month. The Clubhouse features tips from Gravity master trainers, exercise videos, online marketing support (e.g., fliers, posters and press releases), sports-specific training options and discounts on efi products and services like Gravity gear and courses. You'll also receive two new DVDs with new workouts every quarter. There is even a facility membership for \$149 per month that includes all of the DVDs and online programming, but also includes a certain amount of free training for new hires and extra onsite training.

If you decide to take a Gravity training course, you might be eligible to be listed in the registry ACE is developing with efi Sports Medicine. The registry, which will list qualified Gravity instructors, will be made available to the public. “We want to help consumers identify quality instructors versus instructors who are capitalizing on new opportunities and don't have proper education and training, as there is a chance that without the right instruction, consumers could place themselves in potentially compromising positions on the Gravity equipment,” Bryant says.

Use all of this information to make your decision about adding the Gravity System to your training repertoire. Then get out there and take a Gravity class. As I learned, do the workout once, and chances are you'll be hooked. 





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I would like to speak on the matter of individual leg pedaling/leg training....My concern is to ask why this technique was deemed as a mistake when it is actually effective to improve participant's pedal stoke technique. Granted, this should only be instructed while wearing a bike shoe with a cleat (LOOK, SPD-compatible, etc.) to improve the effectiveness of this technique....This technique of single-leg pedaling, while it should not be used with any type of heavy tension, is great for beginners and advanced participants alike, as the beginners will learn what an effective pedal stroke is and how it can be achieved, while the more advanced participants will work on their own efficiency and strengthening of muscles not commonly talked about during your typical indoor cycling class.

—Andy MacDonald, LeMond Fitness
Master Trainer/ACE Education Provider

Good article. However, cyclists don't do one-legged drills just to measure, but perform one-legged drills to ensure both legs are working. It's to create a motor pattern and to "wake up" all the muscles that should work throughout the entire stroke. Most people pedal in squares. By isolating one leg it forces the cyclist to pedal in circles. Plus, if a cyclist (indoor or outdoor) were using predominately one leg, they could be creating a muscular imbalance. Symmetrical weakness is not great, but an asymmetrical weakness is dangerous!

Indoor cycling instructors are limited without the changes of scenery and terrain so one of their few options is to create intensity. Jumping is a way to create intensity. Nothing wrong in jumping. Although there are more forces on the knee, the forces are accommodating. The pedal isn't the ground and therefore "non-weight-bearing" lessening the impact or resistance to the forces of the concentric actions. The key word is "progression" and bike fit.

Thanks for pointing out all of the other ridiculous errors many instructors make.

—John Platero, Director of Education,
The National Council for
Certified Personal Trainers

The [cycling] article begins by discussing how dangerous it is to pedal with only one leg and mentions a lack of benefit from doing so. I disagree with both of these statements entirely. First, where is the danger. If you can not pedal and keep one leg out of the way, you probably should not be on a bike with toe clips or a clipless

pedal system. This article really does a disservice by stating that there is no benefit from cycling with only one leg. Most avid cyclists and even professional cyclists use the one leg technique to work on pedaling in a complete circle. Pedaling in a complete circle is a more efficient cycling technique. One leg pedaling refines strength in both the hamstring and hip flexors. (*Serious Cycling*, 2nd ed., Edmund Burke, page 23).

—Stephen Chase

Editorial Response

by Todd Galati, M.A.

The passion of indoor cycling is alive and well based on the feedback to Karen Asp's article, "Create Safe, Effective Indoor Cycling Classes," in the June/July 2009 issue of *ACE Certified News*. While most feedback was positive, several ACE-certified Professionals expressed their concerns about the inclusion of one-legged cycling on the list of five common mistakes made by indoor cycling instructors.

One-legged pedaling, or isolated leg training (ILT), is a training technique commonly utilized by competitive cyclists to improve their kinesthetic awareness during the full revolution or pedal stroke. The late Edmund R. Burke, Ph.D., who was a physiologist for USA Cycling who conducted extensive research in the areas of cycling and endurance performance, recommended this technique in his books *Serious Cycling* and *High-tech Cycling* because it helps cyclists learn how to pedal in complete circles with each leg. When pedaling with both legs, most people create the majority of pedaling force during the downward phase of the pedaling motion using the powerful hip and knee extensor muscles. The momentum produced by the leg that is pushing downward actually helps the other leg make it through the upward phase in the back of the pedaling stroke. Then, both legs work together to maintain pedal momentum at the top and bottom of the pedal stroke.

Isolated leg training requires the active leg to create enough force to move the pedal through the entire circle. Once a cyclist can effectively perform ILTs with fairly consistent pedal speed throughout the full revolution, he or she should have a more fluid pedal stroke and be able to pedal smoothly at higher cadences when using both legs. For competitive cyclists, pedaling at a higher cadence in the same gear results in increased power produc-

Continued on page 24

Response from Mad Dogg Athletics

We are very concerned about one particular issue with the article, and are receiving quite a bit of feedback from our instructor base. In the article Jumps are listed as one of the "Five Common Mistakes" and are labeled as a "poor choice" by Julz Arney. In addition, the advice is to "eliminate intimidating moves like jumps that may scare people away."

In essence I believe that Arney is probably offering this simply because all too often Jumps are taught incorrectly, as you and I spoke about on the phone, so the advice is to just leave Jumps out of the picture.

But because Jumps are one of the five core movements in the Spinning program, that portion of the article is sending a confusing message to a large segment of the indoor cycling community. Some readers have also expressed concern that there were no comments by me in the Jumps section of the article, fostering the misconception that MDA must then support the belief that Jumps are a contraindicated movement.

Jumps are a very safe and productive movement when taught and executed correctly. This involves using sufficient resistance to support body weight when lifted out of the saddle and by also ensuring that the cadence is controlled and smooth. Indeed, instructors should always be acutely aware of the different levels of students in class and should be prepared to offer modifications to fit the needs of the students. This is done, of course, in a nurturing environment so as not to intimidate anyone.

The information in the Jumps section implies that there is an inherent risk in performing jumps. We are absolutely respectful of other indoor cycling programs and realize that differences of opinion exist. But it's challenging now to be lumped into a position stand that we do not support of another indoor cycling company's perspective regarding Jumps.

Mad Dogg Athletics would like to request that a correction and clarification of our position on Jumps be printed in the next newsletter.

—Luciana Marcial-Vincion, M.A., Spinning
Master Instructor and Master Instructor
Team Manager for Mad Dogg Athletics.



ACE in the News

Serving as America's Authority on Fitness®, the American Council on Exercise and its extended spokesperson network are featured or quoted in print, online and broadcast media, reaching more than 450 million people each year. Check out these recent highlights:

CNNHealth.com (June 26, 2009) – In “After Six Months, a Six-pack Emerges,” author Madison Park covers one young man’s six-month journey to achieving a more chiseled, muscularly defined physique. Find out from Pete McCall, ACE Exercise Physiologist, why the motive behind the transformation might actually lend more reason for concern than celebration.

MSNBC.com (June 22, 2009) – As a certified fitness professional, you’ve probably heard about the Power Plate trend that’s been shaking and vibrating its way through clubs across the globe. In “Exercisers Picking Up Good Vibrations,” ACE exercise physiologist Fabio Comana provides information about, and the overall effects of, these vibrating platforms as well as a list of pros and cons.

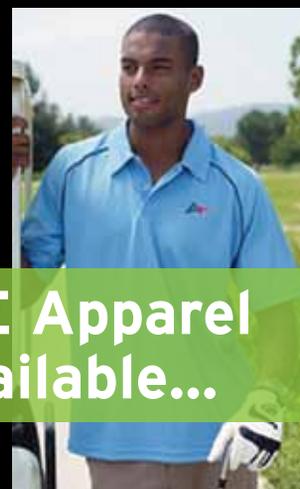
AOL Health (June 17, 2009) – In AOL Health’s popular blog, “That’s Fit,” contributor Ashley Neglia asks: “Do Crunches Hurt or Help?” Among the experts quoted is ACE’s own Jessica Matthews, who explains crunches have the most merit when they’re done moderately and correctly, but adds crunches aren’t necessarily the best exercise to flatten abs. She recommends planks and side bridges—more comprehensive approaches to strengthening the entire core and not merely working one abdominal muscle group.

For access to these articles, as well as other media coverage featuring ACE’s expert spokespeople offering helpful tips and advice, visit www.acefitness.org/media. 

New Program for Military Spouses

Do you know someone who is thinking of becoming ACE certified? The new Military Spouse Career Advancement Account program—MyCAA—can help and is available for military spouses of active duty and activated Guard and Reserve Service members worldwide. Through this program, eligible military spouses can receive up to \$6,000 of financial assistance to help pay for a fitness certification through the American Council on Exercise.

For more information including eligibility, military spouses can visit the Department of Defense’s MyCAA Web page on the Military OneSource Web site at <https://aiportal.acc.af.mil/mycaa/default.aspx>. 



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In the next ACE publication you will receive (i.e., the September/October issue of *ACE FitnessMatters*), the CEC processing fee will increase for printed quizzes going from \$15 to \$20. The online quiz fee will remain unchanged at \$15. To save time and money and reduce paper waste, we encourage you to take your quizzes online. It’s the fastest and most efficient way to process your CECs. 



NEW! **Nutrition Strategies for Fitness & Performance**
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If misinformation regarding carbohydrates, proteins and fluids to improve workouts for you and your clients has left you feeling confused, then this new online course covering sports nutrition and supplements will give you the tools you need to make real and effective enhancements to your

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The rate of obesity in the United States increased from 15 percent in 1980 to 30 percent in 2005. Today, nearly two-thirds of the U.S. population is considered overweight or obese. This puts many Americans at risk for diabetes, heart disease, certain types of cancer and osteoarthritis.



Learn details of fat metabolism and the tools and strategies to develop effective weight management programs in this new online course. Discover associated drivers of this epidemic and how, as a personal trainer or fitness professional, you can design weight-management programs to help combat obesity and facilitate lifestyle change for your clients.

For more information and to order these online courses, please visit the ACE ConEd Center at www.acefitness.org/continuingeducation. ▲

Three Keynote Speakers for ACE Fitness Symposium 2009

Enjoy three exciting keynote presentations at this year's Symposium held November 4–7 in San Diego.

Thursday, November 5, 2009
8:30 am to 9:45 am | 0.1 CEC
10 In - 10 Out: Makings of a Champion, Todd Durkin, M.A.



Improve personal performance, increase energy, achieve life balance and think like a champion. Come explore topics including commitment, focus, passion, mental toughness, physical conditioning, exercise, nutrition, positive attitude, teamwork and making positive connections. Hear stories involving top-level athletes in this motivational keynote on what it takes to achieve peak performance in life.

Friday, November 6, 2009
10:00 am to 11:45 am | 0.2 CEC
Top 10 Nutrition & Fitness Questions (Myth or Fact: You Decide), Heidi Skolnik, M.S.



Clients are comfortable with you—they trust you and ask you questions. Here's your chance to set the record straight. Learn the answers to the top 10 questions personal trainers are most often asked and be prepared with answers that are both scientifically sound and yet totally understandable and practical.

Saturday, November 7, 2009
2:45 pm to 4:00 pm | 0.1 CEC
Beating Boomeritis: Assessment, Prevention, Management & Reversal of Musculoskeletal Ailments, Nicholas DiNubile, M.D.



Musculoskeletal ailments have surpassed the common cold as the #1 reason for doctor visits in the America, and more of your clients are affected by problems with their muscles, bones and joints. Learn to become more familiar with these issues to create and/or modify exercise routines for your clients.

To view the full schedule and register for the ACE Fitness Symposium visit us online at www.acefitness.org/symposium. ▲

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September 9, 16, 23, 30

Start time: 7 p.m. Eastern (4 p.m. Pacific)



The Personal Trainer Exam Review Course is a valuable study tool to help you prepare for the ACE Personal Trainer Certification Exam. The webinar format offers live, real-time lectures and an interactive environment to ask questions, all through the convenience of your own home computer. This course is ideal for people who prefer to learn in their own setting but want the teaching and live support of an ACE instructor.

This complete course includes all four individual modules presented in weekly live webcasts that cover all the key topic areas of the exam content outline along with a review of key concepts and an open forum. The individual modules for the course can also be purchased separately.

- Module 1 - Foundational Knowledge: Applied Science
- Module 2 - Client Interview and Assessment
- Module 3 - Program Design, Implementation, Progression, Modification & Maintenance
- Module 4 - Keys to Success: Test-Taking Strategies & Professional Role

Metabolic Pathways: Guide to the Energy Systems Webinar

Cost: \$34.95 CECs: 0.2

Date: September 10, 2009

Start time: 7 p.m. Eastern (4 p.m. Pacific)



The most current exercise trends aim to induce metabolic stress upon the body to achieve great results. However, effective metabolic programming requires a good understanding of the roles of the metabolic pathways within the body. This webinar reviews the fundamentals of the energy pathways and discusses the application to personal training based on the latest research. An understanding of these pathways will enhance your knowledge of the roles each macronutrient plays in energy metabolism and improve your understanding of fuel utilization; your clients will benefit from exercise programs designed to maximize their metabolic efficiency.

For additional information
or to register, go to
www.acefitness.org/liveprograms

Heartsaver First Aid with CPR and AED Workshop

Cost: \$99 CECs: 0.6

ACE and the American Heart Association (AHA) have teamed together to deliver a dynamic message of hope — the hope of saving lives. New treatments have improved the possibility of survival from cardiovascular emergencies, cardiac arrest, and stroke in a fitness setting where individuals are most at risk when exercising. Increasing public awareness of the importance of early intervention and ensuring greater public access to defibrillation will save many lives.

The seven-hour Heartsaver First Aid with CPR and AED training course will provide fitness professionals with the critical lifesaving skills needed to care for a victim of an illness or injury until EMS arrives.

Course materials will be shipped to you prior to the live workshop date. Please review the materials and bring them with you to the workshop.

The course runs from 9:00 am to approximately 3:30 pm on the date selected.



Sept. 26, 2009
Atlanta, GA
Baltimore, MD
Boston, MA
Irvine, CA
Minneapolis, MN
New York, NY
Portland, OR
San Diego, CA
Seattle, WA

Functional Training & Assessment Workshop

Cost: \$175 CECs: 0.8

Date: October 24, 2009

Locations: Austin, TX; Baltimore, MD;
Boston, MA; San Diego, CA



Functional training continues to grow in popularity as the foundation for fitness and sports conditioning programs. Training to improve posture, movement efficiency and overall muscular performance related to a variety of activities defines functional training. Enhance your knowledge and applied skills with the latest tools and techniques in personal training to stay ahead of the game.

The one-day (8.5-hour) ACE Functional Training workshop teaches the important concepts of functional training by instructing personal trainers on how to:

- Conduct postural assessments and movement screens
- Develop core-training progressions
- Design exercise progressions for postural compensations
- Implement effective dynamic warm-ups
- Introduce sport-conditioning principles into your clients' training programs

ACE Certified News

Continuing Education Self-test

To earn 0.1 continuing education credits (CECs), you must carefully read this issue of *ACE Certified News*, answer the 10 questions below, achieve a passing score (a minimum of 70 percent), and complete and return the credit verification form below, confirming that you have read the materials and achieved a minimum passing score. In a hurry? Take the quiz online at www.acefitness.org/cnquiz for instant access to CECs.

Circle the single best answer for each of the following questions.

- There is a balance between lactate production and removal _____.
A. At rest
B. During steady-state exercise
C. During high-intensity exercise
D. At rest and during steady-state exercise
- During water workouts, heart rate is lower than during land-based workouts _____.
A. Because of the hydrostatic pressure that occurs in water
B. Due to the fact that the body doesn't sweat when submerged in water
C. Because the buoyancy of water reduces the need to recruit the core musculature
D. Due to the emphasis on concentric muscle contractions
- Endurance training adaptations enhance the muscle cell's _____, and thus lowers the amount of lactate production from glycolysis.
A. Ability to generate energy through mitochondrial respiration
B. Accumulation of hydrogen ions
C. Ability to convert pyruvate to lactate
D. Accumulation of water and other fluids
- When exercising on a Gravity GTS, you can vary the amount of resistance from _____ of body weight.
A. 0 to 36 percent
B. 5 to 59 percent
C. 10 to 43 percent
D. 30 to 75 percent
- Some have theorized that the ventilatory and lactate thresholds occur at comparable exercise intensities because _____.
A. A rise in ventilation coincides with decreasing hydrogen ion concentrations
B. Training status and carbohydrate supplementation have the same effect on both thresholds
C. Increased ventilation occurs with increasing hydrogen ion concentrations
D. As ventilation rises bicarbonate production decreases
- Delayed onset muscle soreness is less common following water workouts because _____.
A. The muscles are working primarily during the eccentric phase of a muscle contraction.
B. The muscles are working primarily during the concentric phase of a muscle contraction.
C. The muscles are largely working isometrically.
D. Water exercise promotes full-range exercise movements.
- Which of the following is NOT a component of a training program designed to optimize the lactate threshold?
A. Base-building aerobic training
B. Steady-state LT workouts
C. High-intensity resistance training
D. High-intensity interval sessions
- Which of the following is NOT recommended for aquatic fitness instructors who teach from inside the pool?
A. Teach several movements from the deck first before getting in the pool.
B. Remain at the front of the class so participants can follow your moves.
C. Use hand signals as well as verbal cues.
D. Make face-to-face contact with participants and offer feedback on form and technique.
- Initially, the best way to improve lactate threshold levels is to _____.
A. Increase training intensity
B. Increase training time, but not frequency
C. Increase total training volume
D. Perform high-intensity intervals
- The key to successful steady-state and interval training is _____.
A. Careful monitoring to prevent overtraining
B. To quickly progress to the more effective interval-training stage
C. To maximize training by choosing a single modality
D. To use heart rate exclusively for monitoring intensity

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I attest that I have read the articles in this issue, answered the test questions using the knowledge gained through those articles and received a passing grade (minimum score: 70 percent). Completing this self-test with a passing score will earn you 0.1 continuing education credit (CEC).

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Expires September 30, 2010

Editorial Response

Continued from page 17

tion (watts), which creates greater velocity and hopefully improved performance during competition. While this is important for competitive cyclists and even some cycling enthusiasts, it is important to keep in mind that most indoor cycling class participants do not compete and many don't even cycle outside the gym.

One-legged cycling creates local muscle fatigue not only in the working leg, but also in the muscles contracting isometrically to hold the non-working leg out of the way. Once local muscle fatigue sets in, the participant will have difficulty continuing to complete revolutions without altering form and recruiting additional muscles. A participant who continues exercising with poor form due to local muscle fatigue will be overreaching and at greater risk for injury. Personal trainers working with individual clients can stop an exercise once the client fatigues and can no longer maintain form. Modifications of this nature are feasible, but not as easy for group fitness instructors to implement, as they are generally leading multiple participants of varying levels of fitness and skill. Even when a group fitness instructor provides adjustments for participants who are overreaching, it can be difficult to get enthusiastic participants to adopt the modified technique.

It is important to note that while Dr. Burke recommended ILTs as a training technique in his two books for serious cycling enthusiasts, he did not include this technique in *Fitness Cycling*, his book for recreational cyclists, which he co-authored with Chris Carmichael. In most indoor cycling classes, you will have both new and experienced participants. As with all group fitness classes, it is important to keep in mind that most participants are there to get a good workout while having fun. Any time an instructor considers implementing a training technique that is typically reserved for specific athletes, he or she should determine if the technique is safe, fun, and will have benefits that are actually important for all or most participants. If the instructor cannot definitively say 'yes' to these three key questions, then it would be better to implement a different technique or exercise that is safe and fun for all. 

Todd Galati, M.A., is the Certification and Exam Development Manager for the American Council on Exercise. Todd has a master's degree in kinesiology, a bachelor's degree in athletic training, is a former indoor cycling instructor, and has more than 12 years of experience as a competitive cyclist and coach.



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How to Design a Lactate Threshold Training Program

Continued from page 6

Final Thoughts

The lactate threshold is the most important determinant of success in endurance-related activities and events. Through an understanding of the physiological mechanisms of lactate production (and its utilization and removal in the body) an effective training program incorporating base training, steady-state LT sessions and interval workouts (above the LT) can be properly devised. Furthermore, individualizing the lactate training program to the client's fitness level, age, goals and training time will result in the most realistic and triumphant outcome. 

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