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As the American College of Sports Medicine (ACSM) transitions into a new year, the Committee for Certification and Registry Boards (CCRB) has its share of changes. The CCRB, originally named the Prevention and Rehabilitation Committee (P&R) was formed in 1975 along with the first edition of the Guidelines for Exercise Testing and Prescription. So just think of it: ACSM certification will turn 40 this coming year. There has been much progress in these 40 quick years.

The first three certifications (Program Director, Exercise Specialist, and Exercise Test Technologist) focused on the clinical professional and were groundbreaking at the time because there were no credentials or certifications for exercise professionals. ACSM was truly leading the way and forging ahead with no landmarks as well as no competition. A few years later, Health Fitness Director, Health Fitness Instructor, and Exercise Leader were developed to reflect the needs of the nonclinical exercise professionals.

Over time we’ve observed the cessation of some of the original certifications, the addition of the Registered Clinical Exercise Physiologist, adjustments to some titles (Clinical Exercise Specialist, Health Fitness Specialist) and the offering of certifications for the nondegree exercise professionals (Certified Personal Trainer and Group Exercise Instructor). ACSM currently certifies 3,900 clinical professionals, 10,500 Health Fitness Specialists, and just over 13,000 nondegree exercise professionals. The last three years have seen continued growth in certification, although mostly in the nonclinical credentials.

We have accomplished much in 40 years and have seen the blossoming of many other organizations in the exercise certification field. In concert with the competition, we also must struggle with our profession’s identity within the public sector, medical community, and ultimately in how the exercise profession progresses toward state regulation/ licensure.

Exercise professionals are compared with other health care professions such as dieticians, athletic trainers, and physical therapists, to name a few. Although we share common disciplines and beginnings, the exercise professional is different. First, even at 40 years of age we are the “new kid” on the block. In perspective, we are just approaching adolescence. However, all the professions mentioned have one distinct difference from us. They all developed to enter into patient/client care professions. We evolved from a body of knowledge with roots in physical education and physiology. We evolved because there were no credentials or certifications for exercise professionals. ACSM was truly leading the way and forging ahead with no landmarks as well as no competition. A few years later, Health Fitness Director, Health Fitness Instructor, and Exercise Leader were developed to reflect the needs of the nonclinical exercise professionals.

We must struggle with our profession’s identity within the public sector, medical community, and ultimately in how the exercise profession progresses toward state regulation/licensure.

Thus, some of our challenges in the forthcoming three years will be to come to agreement on our professional identity. The U.S. Bureau of Labor and Statistics lists the bachelor’s-degree exercise professional as an exercise physiologist. The health and fitness industry currently is essentially hiring three types of people: group exercise instructors, personal trainers, and exercise physiologists. Given the market and how we are recognized by others, the discussion surrounding changing the name of the degree would be very useful.
Clinical Column

PART ONE: UNDERSTANDING PACEMAKER SETTINGS

By Jeff Soukup, Ph.D.

Recently, I was reminded of the importance of understanding the settings of a cardiac pacemaker when I had the opportunity to work with a patient who had a new pacemaker implanted after her old device’s battery power began to fail. During the first week of her cardiac rehab program it became apparent that her heart rate response to exercise was unusual and warranted closer attention. In order to understand why such responses were occurring, I needed to understand how her pacemaker was programmed. This reminded me that a review might be beneficial for anyone prescribing exercise in a population that might include individuals with cardiac pacemakers. In the first of this two-part series, I hope to describe how pacemakers are categorized according to a standard coding system and briefly discuss which pacemakers are best suited to treat certain cardiac rhythms. Later, I will describe the physiologic considerations for rate responsive pacemakers and provide suggestions on how to ensure that appropriate exercise modalities are selected based on the pacemaker settings.

Although fixed-rate pacemakers have been used in the past, demand pacemakers are the predominant devices seen in the clinical setting. These pacemakers have the ability to respond or not respond to the signals they sense from the heart’s electrical system and they can be programmed to increase their impulse delivery rate for activities such as exercise. There is an international coding system that is used to describe the settings of pacemakers. The system was developed in 1987 by the North American Society of Electrophysiology (NASPE) and the British Pacing and Electrophysiology Group (BPEG) and it is referred to as the NBG Code. In 2001, because of advances in pacemaker technology, the system was revised and simplified.

The table below summarizes the revised NBG code system that is used to describe the options for pacemaker settings.

<table>
<thead>
<tr>
<th>Position Category</th>
<th>I</th>
<th>II</th>
<th>III</th>
<th>IV</th>
<th>V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chamber(s)</td>
<td>Chamber(s)</td>
<td>Response to Rate</td>
<td>Rate Modulation</td>
<td>Modality</td>
<td>Pacing</td>
</tr>
<tr>
<td>Paced</td>
<td>Sensed</td>
<td>Sensing</td>
<td>Pacing</td>
<td></td>
<td></td>
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<tr>
<td>O=None</td>
<td>O=None</td>
<td>O=None</td>
<td>O=None</td>
<td>O=None</td>
<td>V=Ventricle</td>
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<tr>
<td>A=Atrium</td>
<td>A=Atrium</td>
<td>A=Atrium</td>
<td>A=Atrium</td>
<td>A=Atrium</td>
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<td>V=Ventricle</td>
<td>V=Ventricle</td>
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<tr>
<td>D=Dual (both)</td>
<td>D=Dual (both)</td>
<td>D=Dual (both)</td>
<td>D=Dual (both)</td>
<td>D=Dual (both)</td>
<td></td>
</tr>
</tbody>
</table>

A VVI pacemaker is one that paces the ventricle, senses the ventricle, is inhibited by incoming impulses from the heart’s electrical system, and does not have the ability to adjust heart rate with activity. By comparison, a DDDR pacer will sense and pace both chambers, be both inhibited and triggered by native electrical impulses, and adjust heart rate with activity. Consider the individual who has a problem with the sinoatrial (SA) node and with an inability to consistently generate the stimulating action potential. The pacemaker best suited for this condition may be an AAI or AAIR pacemaker in which the chamber paced and sensed will be the atrium and the response to sensing will be inhibited so that if a signal is generated by the SA node, the pacemaker will not send an impulse to the atria. Or, consider the individual who has atrial fibrillation and requires a pacemaker due to a low ejection fraction; the best pacemaker for this individual would be one that paces and senses the right ventricle. Either a VVI or VVIR pacemaker would be selected, as there is no use for atrial stimulation. Finally, consider an individual with an inability to consistently conduct an electrical impulse from the atria to the ventricles due to an advanced atrioventricular block. The best pacemaker in this case would be a DDD or DDDR device that has the ability to provide coordinated stimulation of the atria and ventricles in order to maintain atrioventricular synchrony.
One of the most important considerations in designing a strength training program is selection of the resistance exercises to be performed. The most recent edition of ACSM’s Guidelines for Exercise Testing and Prescription provides four recommendations for choosing the most appropriate resistance training exercises (page 185). These are as follows:

1. Resistance exercises involving each major muscle group.
2. Multijoint exercises affecting more than one muscle group and targeting agonist and antagonist muscle groups.
3. Single joint exercises targeting major muscle groups also may be included.
4. A variety of exercise equipment and/or body weight can be used to perform these exercises.

Unlike prior editions of the ACSM guidelines that called for 8 to 10 exercises involving the major muscle groups, the current recommendations do not specify the number of exercises to be performed. However, the exercises that are selected should cumulatively provide two to four sets of resistance exercise for each major muscle group (page 182). These sets may be derived from the same exercise or from a combination of exercises affecting the same muscle group (page 182). Assuming that most personal training sessions allot 30 to 40 minutes for strength development, what are examples of resistance exercises that would work most of the major muscles groups with two to four training sets within this time frame? Let’s look first at exercises typically performed with resistance machines.

Table 1 presents 12 standard machine exercises available in most fitness facilities. These include three leg exercises (leg extension, leg curl, leg press), seven upper body exercises (chest press, seated row, shoulder press, pulldown, lateral raise, weight-assist chin-up, weight-assist bar dip), and two core exercises (abdominal flexion, low back extension). Generally, these exercises are ordered from larger to smaller muscle groups and alternated between agonist and antagonist muscle groups as recommended in the ACSM guidelines (page 185). Assuming approximately 60 seconds for each exercise set and 90 seconds between successive exercises, performing 1 set of these 12 machine exercises should require about 30 minutes for completion of the training session. This relatively brief workout provides two exercise sets for the quadriceps, hamstrings, pectoralis major, anterior deltoids, middle deltoids, upper trapezius, and erector spinae muscles; three exercise sets for the latissimus dorsi, teres major, rhomboids, middle trapezius, posterior deltoids, triceps, biceps and erector spinae muscles; and one exercise set for the gluteus maximus muscles.

Now let’s consider some exercises typically performed with free-weights. Table 2 presents eight standard free-weight exercises that are accessible in most fitness facilities. These include two leg exercises (squat, dead lift), and six upper body exercises (barbell bench press, dumbbell bent row, barbell incline press, dumbbell pullover, dumbbell shoulder press, and dumbbell curl). With the exception of the squat and dead lift, these exercises are generally ordered from larger to smaller muscle groups, and alternated between agonist and antagonist muscle groups. Assuming approximately 60 seconds for each exercise set and 90 seconds between sets/exercises, performing two sets of these eight free-weight exercises should require about 40 minutes for completion for the training session. This relatively brief workout...
Today’s article continues a popular format for our Coaching News column, exploring a variety of interesting and challenging client scenarios. We describe a few tips from our science-based coaching toolbox to help you help your clients engage fully in a fit lifestyle that allows them to thrive, whatever thriving means in their lives.

“I started working at a gym in a culturally diverse neighborhood and I am really looking forward to the experience. However, I grew up in a small town without much diversity, and I want to be aware of how my perspectives and experiences could impact my client relationships.”

The coaching perspective and skills are invaluable in helping you work well with clients of diverse backgrounds, especially when your client’s race, gender, cultural, or religious background differs a lot from your own. Of course, coaches bring a beginner’s mind to all clients: no judgment or expectations, combined with a large dose of genuine curiosity. Coaches know they often benefit as much as clients from the coaching experience. When clients have backgrounds that are different from yours, the need for a beginner’s mind and the opportunities to learn are especially important.

Seek to learn about other cultural traditions
In North America, most people are familiar with mainstream Christian cultural traditions, and much less aware of other cultural traditions and major holidays, such as Yom Kippur in the Jewish tradition, or Eid al-Fitr in the Muslim tradition. Seeking knowledge and awareness of cultural traditions outside of one’s own is not only important for scheduling and logistics, but allows you to better appreciate important cultural events and traditions in the lives of your clients. Not all cultures have the same perspective on setting and achieving goals. For example, while some cultures place a high value on the pursuit of individual goal achievement, others place a high value on group contribution and collaborative achievement. Some cultures encourage people to cultivate a sense of personal pride around achievement, while other cultures encourage humility more than pride. Cultural norms influence the why, what, and how a client wishes to set and pursue goals.

Connect
Be present, open, authentic, and warm, greeting your client with a welcoming smile and real eye contact. This is the place to start. How you connect in the first few seconds sends the message that you are all here, accepting, curious, and that you respect your client and you care.

Cultivate and sustain a calm, warm, patient, and respectful tone of voice throughout your time together. Be mindful and adjust if you notice that you are straying from a calm and respectful tone, or internal biases come to mind. Warm connection, rapport, and respect serve as a universal language for human relationships.

Slow down
If you and your client don’t share a common language in terms of background and circumstances, it’s important to slow down your thinking and speech to be sure that you are communicating well. Be thoughtful, intentional, and clear about each word you choose and how you deliver your questions, reflections, and messages.

Check frequently that you and your client understand each other, and you are on the same page. Reflect what you heard, choosing your words carefully, to be sure you “got it.” Ask your client to confirm his/her understanding and listen carefully to be sure you keep getting each other.

Avoid slang
While your cultural slang and metaphors work fine with clients who have similar backgrounds, they can be confusing to someone who is not familiar with your “dialect.” Appreciate that phrases such as “six-pack abs” or “getting ripped” or “clean bill of health” may not be familiar or meaningful.

Interestingly, there is no direct translation for the word “mindfulness” in Spanish. Many everyday concepts may not be understood, so check on your client’s understanding. Then clearly define the word, concept, or message as needed. Pause to be sure your explanation has been well translated and well understood.

Be Curious
Accept that you are a novice in learning not just about your client’s culture and traditions, but also about your client’s inside world—his/her perspectives, circumstances, history, desires, and ideal path forward. Of course even if your clients all looked the same on the outside, their inside worlds would be unique. Diverse backgrounds add even more domains of uniqueness that call you to be ever learning, working hard to understand and appreciate diversity.

Coaching News (continued on page 11)
Clinical Feature

ENHANCED EXTERNAL COUNTERPULSATION: A NONINVASIVE TREATMENT OPTION FOR PATIENTS WITH ANGINA PECTORIS

By Jenna Brinks, M.S.; Anne Davis, RN; and Barry A. Franklin, Ph.D., FACSM

ENHANCED EXTERNAL COUNTERPULSATION (continued on page 11)
Objectives

- Identify the risks associated with physical inactivity among older adults.
- Describe the benefits older adults can obtain from body weight exercise and suspension training.
- Implement strategies for overcoming common exercise barriers with older adults.
- Recognize that suspension training may be valuable to older individuals as an alternate mode of exercise.

Introduction

Physical inactivity continues to pose a major threat to the health and functional ability of older adults. Perhaps the greatest challenge for inactive older adults is to maintain their functional independence, or their ability to perform normal daily activities safely, independently, and without undue fatigue. These older individuals are more susceptible to the development of osteopenia and osteoporosis due to the age-related decline of bone mineral density that, in turn, could result in frailty and fracture. As the majority of older adults remain inactive, they will likely experience greater adiposity, weight gain, reductions in muscle mass and strength, and decreased bone mineral density. Furthermore, inactive older adults are more prone to falls because their stability and overall balance may be compromised from these developed musculoskeletal deficiencies. As health professionals, it is important to identify and implement solutions to combat the potential harmful effects of physical inactivity among the older population.

Body weight training is listed as the number one trend on ACSM’s Worldwide Survey of Health and Fitness Trends for 2015 and may offer excellent options of exercise to promote functional ability to older adults via the improvement in muscular profile, enhanced bone mineral density, and increased balance.

Interestingly, trends eight and nine on ACSM’s 2015 survey are Fitness Programs for Older Adults and Functional Fitness, respectively. These trends, in combination, are hinting at a possible solution to get older adults active and to enhance their overall health. Suspension training can offer an innovative approach by incorporating both body weight and functional fitness.

Benefits of Body Weight Training and Suspension Training

Body weight training may provide an efficient outlet for exercising with older individuals. During body weight exercise, the individual’s body weight acts like a load and stresses the individual’s bones, eliciting bone remodeling. Bone remodeling is essential in enhancing bone mineral density and increasing the sturdiness and solidity of the stressed bones. This load on active musculature stimulates muscular hypertrophy and in turn increases strength and balance. Body weight exercise can be specifically tailored to mock certain movements that are performed during activities of daily living (ADLs). Finally, for older adults who may have difficulty accessing a fitness facility (financial barriers, location, etc.), body weight exercise can be the perfect solution as it is inexpensive, requires limited equipment, can be performed in the privacy of one’s own home, and can easily be used while traveling. Although body weight training can yield these health benefits, it is important to note that the suspension trainer provides a unique way to perform body weight exercises while integrating an additional factor of instability. Suspension units not only possess the appealing qualities of body weight training, but include the benefit of functionality within the workouts.

Table 1: Fitness Trends for 2015

| 1. Body Weight Training |
| 2. High-intensity Interval Training |
| 3. Educated, Certified, and Experienced Fitness Professionals |
| 4. Strength Training |
| 5. Personal Training |
| 6. Exercise and Weight Loss |
| 7. Yoga |
| 8. Fitness Programs for Older Adults |
| 9. Functional Fitness |
| 10. Group Personal Training |

Table 1 reprinted with permission from the American College of Sports Medicine.

Suspension Exercise (continued on page 12)
A PRIMER IN HbA1c AND ADVANCED GLYCATION END PRODUCTS

By Joanne Duncan-Carnesciali, M.S.

Many health, wellness, and fitness professionals work with individuals who have been diagnosed with diabetes mellitus, be it type 1 (T1DM), type 2 (T2DM), latent autoimmune diabetes of adults (LADA), maturity onset diabetes of the young (MODY), or gestational. What is central in all of the variants of diabetes is that glucose metabolism is impaired. Impaired glucose metabolism emphasizes the importance of managing one’s blood glucose (BG) levels. A measurement that assesses how well a person with diabetes (PWD) is managing their BG levels is known as a glycosylated hemoglobin level or HbA1c.

It is generally understood that HbA1c is a reflection of “glucose control over the preceding two to three months and assesses blood glucose control between physician visits”1. Having one’s HbA1c measured at a minimum of two times a year is critical, as poorly managed BG levels are associated with a myriad of diabetes-related complications. However, from the perspective of designing health, wellness, and fitness programs with the goals of 1) reducing risk factors associated with T2DM, 2) improvement of diabetes-related health outcomes, and 3) acquisition of behaviors associated with controlling one’s BG levels. It is imperative for health, fitness, and wellness professionals to acquire a more profound understanding of HbA1c other than being a reflection of glucose control over the preceding two to three months and being associated with diabetes-related complications.

What is Glycosylation?

Glycosylation is the process by which monosaccharaides undergo an enzymatic or non-enzymatic process in which a bond is formed between a reducing sugar and a protein residue. The protein that forms the bond is adult hemoglobin represented by HbA and the 1c is the monosaccharaide glucose that undergoes glycosylation. The process by which nonenzymatic glycosylation occurs is called the Maillard reaction and was discovered by the French scientist Louis Camille Maillard. This nonenzymatic reaction can occur exogenously, as in the case of braising a steak or the browning of bread. However, the nonenzymatic reaction of glycosylation in vivo produces advanced glycation end products (AGEs), which are associated with diabetes-related complications. Advanced glycation end products are strongly correlated to increase in plasma glucose, are strongly correlated with aging, have been implicated in various pathologies that include “connective tissue diseases, Alzheimer’s disease and end-stage renal disease”, and “may contribute to altered muscle force transmission and muscle function with healthy aging”.

These complications underscore the importance of understanding the basics of HbA1c, the process of glycosylation which produces AGEs and the importance of educating individuals with diabetes regarding adoption of the skills associated with diabetes self-management education, particularly management of one’s BG levels.

How are AGEs measured/detected?

AGEs are detected by the presence of blood biomarkers called pentosidines, which are “fluorescent AGEs, formed by a cross-link between lysine and arginine residues”. It has been observed that levels of plasma pentosidines are “influenced by the quality of glycemic control and renal function”, in addition to being correlated “with hypertension and ischemic heart disease”.

Approaches to assist PWDs in understanding the importance of managing their BG levels can include posing questions that stimulate conversation pertaining to HbA1c levels, such as: Are you aware of the similarities between HbA1c and the golden crust of freshly baked bread? Alternatively, one might ask, how likely is it that a slice of toast become untoasted? Just as one cannot untoast a slice of bread, AGEs cannot be reversed as they are chemical reactions.

It must be highlighted that endogenous nonenzymatic glycosylation occurs in all humans, whether or not an individual has been diagnosed with diabetes. Accumulation of AGEs has been observed in cartilage tissue of the knee in individuals with end-stage osteoarthritis.

In Summary

Having a broader understanding of HbA1c and glycosylation enables the health, wellness, and fitness professional to better educate PWDs regarding managing their blood glucose levels. In addition, it equips them with knowledge that can be useful in achieving national health objectives and goals pertaining to diabetes, as outlined in Healthy People 2020.

About the Author

Joanne Duncan-Carnesciali, M.S., RCEP, is a Health Education doctoral candidate in the Health and Behavior Studies Department at Teachers College, Columbia University.

References


HbA1c and Advanced Glycation (continued on page 13)
ACSM certified exercise professionals is a credible discussion point.

As a result, the CCRB has conducted extensive research prior to updating the titles of its certifications, surveying certified professionals, fitness industry employers, health and medical partners, and the general public. The proposed name changes were to change the ACSM Certified Health Fitness SpecialistSM to ACSM Certified Exercise Physiologist and the ACSM Certified Clinical Exercise SpecialistSM to ACSM Certified Clinical Exercise Physiologist. This would give us three “exercise physiologist” titles, from the bachelor’s degree exercise physiologist and clinical exercise physiologist to the master’s degree registered clinical exercise physiologist. The survey data showed the new names resonated with audiences across the board, with more than 70% of all individuals surveyed agreeing with the new titles.

The CCRB proposed the name changes to the ACSM Board of Trustees at its November meeting. The ACSM board voted in support of both changes, based on the evidence presented by the CCRB. It was announced February 4, that the names of two ACSM fitness certifications will be revised to better represent the scope of practice and expertise of the fitness professionals holding these titles. The new titles, ACSM Certified Exercise Physiologist and ACSM Certified Clinical Physiologist, will replace ACSM Certified Health Fitness SpecialistSM and ACSM Certified Clinical Exercise SpecialistSM, respectively.

Exercise professionals holding an academic degree have additional knowledge that is not duplicated in other health-related professions. Naming these certifications “exercise physiologist” helps the public better understand and recognize the high level of training and education these exercise professionals have attained. The CCRB looks forward to continuing its efforts in moving the profession forward.

About the Author
William F. Simpson, Ph.D., FACSM, is an associate professor at the University of Wisconsin-Superior and directs the Exercise Physiology Laboratory. His experiences include YMCA fitness director, cardiac rehabilitation, and 20 years in higher education, including as health promotion and wellness faculty. He has been a member of ACSM for more than 30 years and is currently serving as the chair of the Committee of Certification and Registry Boards. Outside of the classroom and laboratory he enjoys running, cooking, and hanging out with his daughters.

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Strength Training Exercises (continued from page 4)

provides two exercise sets for the rhomboids, middle trapezius, posterior deltoids, middle deltoids, and rectus abdominis muscles; four exercise sets for the quadriceps, hamstrings, gluteus maximus, pectoralis major, latissimus dorsi, teres major, upper trapezius, anterior deltoids, biceps, and erector spinae muscles; and six exercise sets for the triceps muscles.

A large research study that examined exercise type, intensity, duration, and frequency demonstrated that the ACSM strength training guidelines are effective for significantly improving body composition in beginning exercisers between 21 and 80 years of age. The 845 study subjects who performed 1 set of 12 machine exercises 2 nonconsecutive days per week for 10 weeks increased their lean weight by 3.1 pounds and decreased their fat weight by 4.4 pounds. The relative brief exercise sessions performed two or three days a week produced impressive 6.3-pound and 7.5-pound improvements in body composition, respectively, in less than three months of training.

In summary, the ACSM strength training guidelines call for multijoint and single joint exercises that cumulatively address each major muscle group for two to four sets. Given a typical 30 to 40 minute strength training session for new exercisers, this can be accomplished by performing one or two sets of eight to 12 carefully selected resistance exercises such as the protocols presented in Tables 1 and 2.

Table 2. Sample free-weight workout with 8 exercises that address most major muscle groups (2 sets per exercise).

<table>
<thead>
<tr>
<th>Exercise</th>
<th>Major Muscle Groups Addressed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Squat</td>
<td>Quadriceps, hamstrings, gluteus maximus, erector spinae</td>
</tr>
<tr>
<td>Deadlift</td>
<td>Quadriceps, hamstrings, gluteus maximus, erector spinae, upper trapezius</td>
</tr>
<tr>
<td>Barbell bench press</td>
<td>Pectoralis major, triceps, anterior deltoids</td>
</tr>
<tr>
<td>Dumbbell bent row</td>
<td>Latissimus dorsi, biceps, teres major, rhomboids, middle trapezius, posterior deltoids</td>
</tr>
<tr>
<td>Barbell incline press</td>
<td>Pectoralis major, triceps, anterior deltoids</td>
</tr>
<tr>
<td>Dumbbell pullover</td>
<td>Latissimus dorsi, teres major, rectus abdominis</td>
</tr>
<tr>
<td>Dumbbell shoulder press</td>
<td>Middle deltoids, triceps, upper trapezius</td>
</tr>
<tr>
<td>Dumbbell curl</td>
<td>Biceps</td>
</tr>
</tbody>
</table>

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About the Author
Wayne L. Westcott, Ph.D., teaches exercise science at Quincy College (MA) and is an active member of the New England Chapter of the American College of Sports Medicine.

References
Keep your questions simple and open. What would be important for me to know about you? What brings you to this fitness project today? What do you hope will happen? How can I best help you? What has worked for you in the past? What concerns do you have about my ability to help you? What will success look like for you?

Working with clients who bring cultural backgrounds and experiences that differ from your own is a welcome challenge. They call you to be more present, respectful, purposeful, and engaged, ever mindful of your own internal assumptions, biases, and judgments toward other cultures and perspectives. These experiences take you a step closer to becoming a global citizen, someone who is at home wherever you go and with whomever you meet.

**Enhanced External Counterpulsation (continued from page 6)**

whereas the control group remained unchanged. Furthermore, EECP treated patients experienced a reduction in anginal symptoms and an improvement in the New York Heart Association classification, while these outcomes remained unchanged in the control group.

Gloekler and colleagues reported similar results performing cardiac catheterizations on 20 patients with stable coronary artery disease before and after EECP therapy. Their ingenious methodology employed “sham EECP therapy,” where patients in the control group were provided with low-pressure treatments well below the threshold pressures needed for therapeutic effectiveness. Measurements assessing coronary flow and collateral function showed improvements in the treatment group, but not in the “sham” controls.

In addition to studies investigating the effects of EECP on cardiovascular physiology, research has focused on selected objective (i.e., exercise tolerance) and subjective (i.e., reported symptomology, quality of life) measures to assess the effectiveness of therapy. For example, Wu and colleagues measured walking distance, functional class, and self-reported quality of life before, immediately following, and 6 months after completing a course of EECP therapy in patients with refractory AP. Six-minute walk test distance, the Canadian Cardiolo vascular Society (CCS) classification of symptom severity, and seven of eight subscales assessed in a health-related quality of life survey all showed significant improvements following treatment. Positive changes in reported CCS class and quality of life indicators were maintained at the six-month follow up.

The International EECP Patient Registry, started in 1998, has contributed a wealth of data to support the anti-anginal effects of EECP therapy. In a 2008 update, data on more than 1,400 patients demonstrated that 78% of patients improved CCS classification by at least one class immediately following a course of EECP, and 38% of patients improved by two classes. These changes persisted after a 3 year follow-up in 74% of the 1,061 patients surveyed.

To clarify the impact of EECP therapy in patients with AP and left ventricular (LV) dysfunction (ejection fraction ≤ 35%), 363 patients were evaluated before, immediately following, and 2 years after a course of EECP therapy, which was well tolerated. Anginal class was improved in 72% of patients at the completion of EECP, and this was maintained in 55% of patients at 2-year follow up. Interestingly, more than half of all participants (52%) were able to discontinue nitroglycerin therapy after EECP. Furthermore, quality of life measures improved substantially post treatment and were maintained at the two-year follow up.

Research also suggests that angina patients with aortic stenosis (AS) may be appropriate candidates for EECP therapy. Braver man and colleagues administered EECP therapy to 86 symptomatic patients, 43 with and 43 without mild-to-severe AS, and compared adverse event rates and outcomes. Both groups demonstrated similar improvements in CCS angina class and hemodynamics, with no adverse cardiac events in either cohort. Although this study was relatively small, included few women, and was comprised of primarily mild-to-moderate AS patients, the results suggest that the safety and effectiveness of EECP therapy may be generalized to additional patient populations.

**Medical Contraindications and Special Considerations for Therapy**

Although most patients with AP are appropriate candidates for EECP and subsequently demonstrate good tolerance to therapy, certain preexisting conditions may preclude participation. Common contraindications to EECP therapy include a history of deep venous thrombosis, selected cardiac dysrhythmias which interfere with synchronization, uncontrolled hypertension, or history of a recent cardiac catheterization, since the elevated

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**Emerging Coaches (continued from page 3)**

Online courses. She co-authored the ACSM-endorsed Coaching Psychology Manual, the first coaching textbook in health care and the Harvard Health Book published by Harlequin: Organize Your Mind, Organize Your Life.
It is widely known that exercising with an aging population can pose some challenges for practitioners; however the importance of exercising and aging is also very clear. The uniqueness of suspension training is that it allows one to perform a variety of exercises using only two suspension straps. This variability, along with appropriate exercise intensity for older adults, can help avoid common barriers to exercise such as time constraints and boredom. Practitioners may find that, when training for muscular strength using traditional programming, clients find the workouts redundant and may quickly lose interest. Exercises using suspension training are largely modifiable in terms of intensity and, therefore, may serve as an optimal device for implementing body weight exercise among older adults. Traditional strength training sessions require a multitude of equipment and some resistance training experience for adequate results. Suspension training requires minimal setup to transition from one exercise to the other and is easy to take along while traveling.

**Goal of Suspension Training for Older Adults**

The goal of almost any exercise program for older individuals includes reduced fall risk and an increased ability to perform ADLs. Both of these goals can be achieved by increasing muscular fitness. Greater muscular fitness, as well as postural stability, can be achieved through suspension training which will allow for greater control over the body. This control will most likely improve balance but also reduce fall risk. If falling becomes a nonissue, the individual's ADLs will improve along with his or her overall quality of life. Therefore, the main goal is to improve muscular fitness and thereby to improve the ability to complete ADLs. To do this, suspension training allows the body to move against gravity instead of an external load, which greatly expands the quantity and variety of body weight exercises that can be used. Because of the instability of the straps, training can be done in a way that mimics the unstable conditions we live in. Training in a similar environment as everyday life will more effectively improve ADLs than traditional resistance training; therefore, suspension training will be more beneficial in older adults. We know that traditional resistance training increases muscular fitness, leading to greater stability and lowered fall risk in older adults. Incorporating a factor of instability has further been shown to enhance this benefit by adding trunk or core training to each activity. Unstable surfaces can be used to elicit this response, including suspension straps.

**Summary**

In conclusion, suspension training options are a great tool for any older person to develop balance, muscular fitness, and independence. These straps are convenient and portable, which makes them ideal for individuals traveling often. They can be used at any intensity and any skill level because they eliminate the use of external resistance. Once again, the major purpose of advocating body weight and suspension exercise as a physical activity among older adults is to promote functional independence and health. It is important to note that the authors are not dismissing cardiorespiratory fitness as a large component to promote health among older adults, but that they are acknowledging that functional independence may rely more on the muscular fitness component.

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**References**

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lower extremity pressures may cause bleeding at the catheter insertion site. As discussed previously, caution may be taken when referring AP patients with certain cardiac valvular diseases; however, a recent study in a small number of patients with AS provided encouraging results. Ultimately, each patient and his/her cardiologist should collectively consider individual health status and potential risks and benefits of therapy to determine if EECP is a viable option.

If a patient is referred and medically cleared to participate in EECP, special considerations are taken to help ensure that the therapy is well tolerated. Seamless pants are provided to the patient by the treatment facility to minimize the risk for developing pressure sores or bruising. Throughout treatment, staff is attentive to patient feedback about pinching or tenderness during cuff inflation, and assess associated abrasions or reported discomfort. Rare complications or adverse reactions are immediately reported to the referring physician for timely evaluation and follow-up. Finally, a thorough patient screening and evaluation prior to and following each EECP session provides an assessment of appropriate tolerance and response to treatment.

Conclusion
For patients with symptomatic coronary disease, EECP represents a beneficial, safe, non-invasive treatment option to reduce anginal symptoms, increase symptom-limited functional capacity, and improve quality of life. EECP is recognized by Medicare and most commercial insurance carriers as a bona fide covered therapy for patients with AP; thus, physicians should consider prescribing this treatment for their coronary patients who have otherwise exhausted pharmacotherapeutic and coronary revascularization options without symptom relief. While few comorbidities or diagnoses preclude participation in EECP, most patients with AP are eligible and can achieve significant long-term health and quality of life benefits.

Due to the activity limitations that severe AP may impose, these at-risk patients often find themselves in the least fit, least active cohort (bottom 20%)—the primary beneficiaries of an exercise-based cardiac rehabilitation program. For such patients, EECP may serve as a gateway to more vigorous exercise, and should be included in a comprehensive continuum of cardiac rehabilitation services.

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