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Emotional Brain Training for Treating Obesity, Eating Disorders, and Stress

by Laurel Mellin, MA, RD

Treatments of obesity, eating disorders, and symptoms of stress are changing. In this era of the brain, discoveries in neuroscience are sifting down to the practice of dietetics. The brain can be conceptually divided into the thinking brain (neocortical) and the emotional brain (limbic and reptilian), and in our role as dietitians, we can impact the neocortical brain by providing clients with objective information on how and why they should alter their eating behaviors to improve their health. However, when the emotional brain is in stress, following through and complying with those recommendations can be challenging.

Emotional brain training (EBT) emerged from neurobiological discoveries that emotional circuits in the brain were plastic and could be rewired by experiences.[1] The EBT method trains individuals to process daily life stress more effectively by rewiring emotional circuits of self-regulation as a means to improve self-regulation and access to natural rewards. This potentially offers a strategy to promote lasting improvements in stress symptoms. With psychological stress[2-4] and stress-related conditions[5-6] affecting many individuals in the United States, the implementation of evidence-based, neuroscience-centered interventions to decrease stress could significantly impact public health. While health care has traditionally treated stress symptoms as the problem and relied heavily on medications, devices, and procedures, EBT represents a new paradigm in health care: a focus on treating the source of the stress itself by wiring the emotional brain.

The History of EBT

We have long recognized that knowing what to eat does not necessarily translate into lasting food behavior changes. Early in the development of the EBT method, our team at the University of California, San Francisco (UCSF) became aware of the work of Hilde Bruch, a psychiatrist from Baylor College of Medicine who published a paper in 1940 showing that a child's risk of developing obesity was largely influenced by interactions with his/her parent(s). According to Bruch, children who were not adequately nurtured and those with limits that were either too harsh or too lax had an increased risk of obesity. We began teaching responsive parenting skills at the UCSF clinic and

observed that many of the children stopped wanting extra food. We applied a similar intervention—The Solution Method—to patients with adult obesity and stress symptoms.

More recently, brain imaging studies have shown that the brain is highly plastic and changes with experience. The response to daily life—self-regulation—is so integral to survival that it is stored in unconscious memory systems. Although most people report that they use exercise, read the paper, or employ other means to ease stress, the regulatory processing of daily life is an ongoing process, guided by wiring stored in the emotional brain. The strategy of EBT is to improve the effectiveness of that wiring.

Several reports of the efficacy of EBT have shown sustained beneficial effects during and after treatment for obesity, blood pressure, blood sugar, depression, and exercise.[7,8] Thus, the EBT method is grounded in axiomatic physiology and there is evidence of its health-promoting effects. This article reviews the four concepts of EBT and describes the method's clinical application to stress-related conditions, including obesity and eating disorders.

Concept 1: It's Not Us, It's Our Wiring

Instead of focusing on that doughnut and why one ate it, go deeper. Focus on the wires. The wires that trigger overeating flash across the brain in time measured in ten thousandths of a second. Who can be responsible for what happens in that time frame? In EBT we recognize that all emotions, thoughts, and behaviors are just strings of neurons that are continually potentiated.[9]

By turning our attention to the wiring, we can go to the root cause of a chronic stress response. What holds us in a sense of safety in this world are our homeostatic circuits (the neuronal circuits of self-regulation) that take us through a stressful moment and carry us back to our natural state of well-being. The allostatic circuits, on the other hand, do not have internal self-correcting mechanisms, so the stress buzzer gets stuck in the "on" position.[10] In allostatic states, the brain reward circuitry cannot access the natural rewards. The brain is reward-driven, and defaults to accessing artificial rewards that promote chemical highs and lows rather than the natural rewards, which are sustainable and adaptive (e.g., intimacy, spirituality exercise, music, dance). In EBT, we teach people how to identify and weaken or erase allostatic circuits and how to identify and strengthen homeostatic circuits.

Concept 2: Wiring Triggers Brain States

When a wire is triggered, the brain responds by shifting the area in charge.[11] The lower-order areas react quickly, so the brain defaults to them

The Five Brain States

Stress	Brain State	Perception
	1	Joyous
	2	Balanced
	3	A Little Stressed
	4	Definitely Stressed
	5	Stressed Out!

As stress increases, the more primitive areas of the brain become dominant.

Table 1. Emotional Brain Training (EBT) Five-Point System of Emotional and Behavioral Regulation: The five brain states Copyright ©2010 Laurel Mellin, *Wired for Joy* (Hay House). Reprinted with permission.

From The Editor

Mark Kern likes this.

by Mark Kern, PhD, RD, CSSD, Editor-in-Chief

I'm not referring to my letter here, but rather to this issue of *PULSE*. This wasn't one of those issues that easily falls into place, so I'm really happy with the way it turned out. Maybe it's just more rewarding when everything comes together after a little extra work, but that could just be the emotional part of my brain talking. And that brings me to our cover article by Laurel Mellin, MA, RD, who describes her thoughts on how dietitians can help their clients train the emotional regions of the brain for combating disordered eating and eating disorders as well as stress.

After you've warmed up your brain with that article, you should read our free continuing professional education (CPE) article contributed by Diane E. Alexander, PhD, and *PULSE's* newest wellness editor, Robert Wildman PhD, RD, FISSN. The article provides a review of the latest research on some key nutrients for optimal eye health and function. In this issue you'll also find a cutting-edge article by Tyler Barker, PhD, who reviews the latest research on vitamins C and E for injury and surgery recovery in athletes, and a very practical article on worksite-based health promotion from Marisa Moore, MBA, RD.

Be sure to also take a look at our book review on mindful living, peruse our summaries in SD-USA's Research Digest and in Conference Highlights, and discover the latest notable accomplishments of our members. After you've finished reading this issue, maybe I'll see a comment on SCAN's Facebook page indicating that, like me, you like this issue, too.

when stress mounts. These more primitive areas of the brain experience more extreme and maladaptive thoughts and behaviors. All aspects of life are predictably affected, and even though the specific characteristics vary, the extent to which they are maladaptive remains the same. A summary of these characteristics appears in Table 1.

In Table 2, the numbers on the left indicate the five brain states. Brain State 1 occurs when a person is relaxed and his/her reward circuitry is balanced. In this state, eating a crisp, red apple is rewarding. The drive for sugary, fatty food is low and moods are positive as the neocortex is in charge. As stress mounts the state changes to Brain State 5, a full-blown stress response. In this state, the primitive brain is in charge and the drive for artificial rewards ramps up. Moods are negative.

The fact that wiring triggers brain states that are internally consistent supports the potential efficacy of treating the brain state rather than treating the characteristic of that brain state. For example, the intervention for compulsive eating (a symptom of a brain state) may be quite narrow in traditional care, but in reality the compulsive eater's drive for food may be driven by various circuits activated in that brain state—emotional, cognitive, and behavioral circuits—all of which impact the effectiveness of the intervention. By treating the brain state, a broader spectrum of improvements may occur, potentiating the effectiveness of the intervention.

The EBT Brain States

Thoughts	Feelings	Relationships	Spirituality	Behavior
1 –Abstract	Joyous	Intimate	Connected	Optimal
2 – Concrete	Balanced	Companionable	Aware	Healthy
3 – Rigid	Mixed	Social	Unaware	Moderate
4 – Reactive	Unbalanced	Needy/Distant	Disconnected	Unhealthy
5 – Irrational	Overwhelmed	Merged/Disengaged	Lost/Obsessed	Destructive

Table 2. The Emotional Brain Training (EBT) Five-Point System of Emotional and Behavioral Regulation: Brain state characteristics. Copyright ©2010 Laurel Mellin, *Wired for Joy* (Hay House). Reprinted with permission.

Concept 3: Brain States Become Persistent

The brain equates familiarity with safety. Therefore, if an individual is frequently in a brain state of stress, the brain misinterprets stress as good, because it is familiar. For such individuals, the brain can easily get into the "stress habit," and in time the repeated episodes of stress increase allostatic load—the wear and tear on the mind and body caused by each stress episode. The emotional set point of the brain can remain stuck in an allostatic state. The problem is not the symptom of stress (e.g., overeat-

ing, smoking, inactivity) but a brain that is wired for stress.

Concept 4: We Can Change Our Wiring

If the root cause of the problem is our wiring and if we know that the emotional brain is plastic[12] and can change through experiences, why not target the neurobiological source of the chronic stress symptoms? Why not support clients in learning the tools to rewire their own emotional brain? We can do that, but it will be challenging because it requires a paradigm shift. We have to learn the new tools, and not everyone will agree with us. Yet the reward lies in attending to the root cause—and that is powerful.

Emotional brain training is remarkably simple, but not easy. In EBT, individuals learn to identify their brain state on a five-point scale. For each state, a different brain area is dominant, requiring a different process in the brain to return to optimal states. Clients learn how to identify their brain state and switch it back to states of well-being. The tools mirror the evolutionarily-based processing of stress in a secure attachment.[13] The training offers lifestyle changes, appropriate use of health care, and a focus on changing the wiring in the emotional brain to promote lasting post-treatment improvements in stress-related outcomes.

Clinical Practice

EBT is administered to patients throughout a four-week introductory course; six additional courses for advanced cases are also available. The initial course provides training in how to identify one's brain state and facilitate switching each state to homeostasis. Some complete only the initial course because their emotional set point is in a higher state and can be changed relatively easily. However, if the set point is in the allostatic range (Brain States 3- 5), more focused and intensive practice over time is typically required for significant improvements to occur. The additional courses utilize EBT kits, workbooks, pocket reminders, and audio programs to allow for advanced practice. All courses are facilitated by certified EBT providers. These health professionals hold small group (8 to 10 people) training sessions for 90 minutes weekly.

In recent years the program has addressed changing learning styles and needs, utilizing briefer workbooks and the addition of video training, social networking, and Web-based tools. The goals are to create a robust community and enhance the emotional salience and fun of the training, both of which increase dopamine, which facilitates neuroplasticity. For participants who complete the entire advanced program, the duration of training is approximately one year and the goal is to rewire the brain for the homeostatic state (Brain State 1), in which one reaps an abundance of natural rewards and, within the limits of genetics and choice, has freedom from various external solutions (addictions and compulsions).

> "Among the most promising clinical strategies we have identified is rewiring circuits that form maladaptive attachments."

Clinical Applications for Eating Disorders and Obesity

Most participants in EBT have experienced eating or weight issues. The treatment of both types of issues has been integrated into advanced EBT courses. The lifestyle component focuses on physical activity, nutrition, sleep, meditation, and intimacy. The food system used in EBT is based on stress and reward, with participants identifying foods that ease stress and those that increase it. It reflects a new emphasis on the addictive nature of food.

In using EBT to treat obesity and eating disorders, one challenge is orienting participants to this new paradigm that asserts that obesity can be a symptom of an allostatic set point and treatment involves changing the set point. As the set point changes, the circuitry that promotes these symptoms will be reconsolidated. By moving up the emotional set point to states of balance and reward, a range of beneficial effects may result.

Among the most promising clinical strategies we have identified is rewiring circuits that form maladaptive attachments. Rewiring "survival circuits" is a three-stage process, because these circuits were encoded during a full-blown stress response. The brain can create a false association between survival and some external solution such as sugary food. The more a person attempts to change the behavior without addressing the emotional drives for that behavior, the more stressed an individual may become. That amplified stress can trigger the same circuit that caused the overeating to begin with. Instead of trying to suppress the symptom in clients, we focus on turning their attention to erasing the circuit[14] that triggers those unstoppable drives.

The goal is not just behavioral compliance, but the experience of not wanting or needing the extra food. In this method, the clinical strategy is to reframe the overeating as the reflection of a wire and then to rewire the circuit, instead of forcing behavioral change, so that the drive to overeat fades.

Concluding Remarks

Emotional brain training offers a neuroscience-based intervention in which registered dietitians and other health professionals use positive emotional plasticity to rewire the emotional brain to favor states of balance and positive emotions. Registered dietitians who are experienced and trained in psychological tools and counseling can become certified in the method and can facilitate group training and coaching in the method. This method represents a new paradigm in health care with the goal of promoting broad spectrum, persistent improvements in a range of stress-related variables.

For more information about EBT research and certification, visit www.ebt.org. A new book on EBT, *Wired for Joy* (Hay House, 2010), is available and the previous *New York Times* bestseller, *The Pathway*, is also relevant to RDs.

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CPE article

Lutein and Zeaxanthin: Essential Nutrients for Eye Protection and Visual Performance

Diane E. Alexander, PhD, and Robert Wildman, PhD, RD, FISSN

*This article is approved by the Commission on Dietetic Registration (CDR) for 1 continuing professional education unit (CPEU), level 1. To apply for **free** CPE credit, obtain a question/answer sheet through one of the following methods: (a) download it from SCAN's Web site (www.scandpg.org), or (b) request it from the SCAN Office via phone: 800/249-2875; fax: 866/381-7288; or e-mail: scandpg@gmail.com.*

Learning Objectives

After you have read this article, you will be able to:

- Describe the functional roles of lutein and zeaxanthin in ocular tissue and their impact on vision.
- Discuss food sources, the bioavailability, and the suggested daily intake of lutein and zeaxanthin.
- Explain how lutein and zeaxanthin concentrations in macular tissue are measured.

Eye health and loss of vision as we age are of great concern, leading many to seek preventive measures by obtaining essential nutrients through diet and/or supplementation. Lutein and its sister molecule zeaxanthin are considered by many health care professionals to be essential eye nutrients needed daily to maintain healthy vision and help reduce the risk of certain age-related eye conditions. Lutein and zeaxanthin are carotenoids found naturally in dark green, leafy vegetables; corn; certain fruits (e.g., oranges, tangerines, goji berries); and eggs. While lutein and zeaxanthin have traditionally been associated with reduced risk of certain age-related eye conditions, emerging research suggests that the optical and antioxidant properties of these nutrients can also improve visual function and performance, thereby extending important benefits to a younger, healthier population. This article provides an overview of the growing body of evidence supporting the link between levels of lutein and zeaxanthin in the eye and enhanced visual performance, which is of particular importance to health-conscious and active people who spend considerable time outdoors exposed to sunlight.

> "Carotenoids must be obtained solely from the diet, and they share a place on the growing list of nutraceutical ingredients."

Functions of Lutein and Zeaxanthin

Carotenoids are red, orange, and yellow lipid-soluble natural pigments that share a common biochemical structure. More than 600 carotenoids have been identified in nature and are produced by plants, algae, and bacteria to provide coloration and absorb light energy. Humans and other mammals cannot produce carotenoids, even though these molecules provide critical benefits for many organ systems. Therefore, carotenoids must be obtained solely from the diet, and they share a place on the growing list of nutraceutical ingredients.

Although no reference daily intake (RDI) has been established for most carotenoids, a case can be made for consuming compounds in this class of nutrients every day. Of the 600 carotenoids isolated, only a small subset is found in a typical human diet.[1] Of these dietary carotenoids, only lutein and zeaxanthin and their metabolites are found in the macula, the central portion of the retina responsible for central vision and high-resolution visual acuity, suggesting an important functional role for these molecules in the eye.[2] The high concentrations of lutein and zeaxanthin in the macula are responsible for the characteristic yellow coloration, giving rise to the term macular pigment.[3]

In the macula, lutein and zeaxanthin act as a pair of "internal sunglasses." First, they attenuate short wavelengths of light in the blue region of the visible light spectrum as they absorb light maximally at a wavelength of 460 nm.[4] These wavelengths of visible light are particularly damaging, because they are high energy and can pass through outer structures of the eye such as the lens, which absorbs ultraviolet wavelengths of light. In addition, these visible wavelengths of high-energy blue light are efficient at generating reactive oxygen species (a principle type of free radical) and they contribute to visual glare and photophobia.

The second function of lutein and zeaxanthin is to act as an antioxidant defense to neutralize free radicals. Both the visible light filtering and antioxidant properties of lutein and zeaxanthin enable these molecules to reduce damage to ocular tissues

that occurs from daily exposure to sunlight, indoor lighting, and environmental pollutants. Over time, this damage can lead to certain eye conditions such as age-related macular degeneration (AMD) and cataract. As mentioned previously, people who spend more time outdoors—especially without eye protection—may be at greater risk for these eye disorders than those who minimize their exposure to sunlight.

The earliest research establishing the link between lutein and zeaxanthin and eye health consisted of an epidemiological study from the Eye Disease Case-Control (EDCC) Study Group published in 1993 and a follow-up by Seddon and colleagues on a subset of EDCC patients published in 1994.[5,6] The findings from both studies indicated that individuals with the highest dietary intake of lutein and zeaxanthin had a 57% risk reduction for AMD.[5] Over the past 15 years, many more observational studies have supported these findings.[7]

Food Sources, Bioavailability, and Suggested Daily Intake

Because lutein and zeaxanthin are not synthesized in the body, they must be acquired from the diet either through foods or dietary supplements. These carotenoids are fat soluble, so their absorption is enhanced when consumed with a modest amount of fat. The richest sources of lutein are dark green, leafy vegetables such as kale and spinach (see table).[8] Egg yolks provide a highly bioavailable source of lutein, probably because of the associated lecithin content, even though the lutein concentration is relatively low.[9] Other dietary sources of lutein and zeaxanthin such as corn and oranges contain esterified forms of these molecules, which are less bioavailable. This is important to note because the biologically active forms of these xanthophylls are free of fatty esters.

Following ingestion and absorption, lutein and zeaxanthin are deposited in a number of body tissues including eye, skin, brain, breast, and cervix. However, lutein is found in the macula at 10,000 times the concentration of that in serum, and this tissue-specific pooling is likely due to

Table. Food Comparisons (Lutein and Zeaxanthin Content)

Food	Common Measure	Content per Measure	Amount Needed to Obtain 10 mg of Lutein and Zeaxanthin
Kale, cooked	1 c (130 g)	23.7 mg	0.42 c
Turnip greens, cooked	1 c (144 g)	12.2 mg	0.82 c
Collards, cooked	1 c (190 g)	14.6 mg	0.68 c
Spinach, cooked	1 c (180 g)	20.4 mg	0.49 c
Spinach, raw	1 c (30 g)	3.7 mg	2.70 c
Broccoli, cooked	1 c (156 g)	1.7 mg	5.88 c
Corn, cooked	1 c (210 g)	2.2 mg	4.55 c
Lettuce, romaine	1 c (56 g)	1.3 mg	7.69 c
Orange	1 orange (131 g)	0.17 mg	58.82 oranges
Green beans, cooked	1 c (125 g)	0.89 mg	11.24 c
Peach, fresh	1 peach (98 g)	0.89 mg	11.24 peaches
Corn on the cob	1 ear (77 g)	0.7 mg	14.29 ears
Carrots, raw	1 carrot (72 g)	0.18 mg	55.56 carrots
Blueberries, raw	1 c (145 g)	0.12 mg	83.33 c
Eggs	1 large egg (50 g)	0.17 mg	58.82 large eggs
Corn Chex cereal	1 c (30 g)	0.35 mg	28.57 c
Tangerine	1 tangerine (84 g)	0.12 mg	83.33 tangerines
Asparagus	4 spears (60 g)	0.46 mg	21.74 spears
Mustard greens	1 c (140 g)	8.3 mg	1.20 c

Source: USDA National Nutrient Database for Standard Reference, Release 22

lutein- and zeaxanthin-specific binding proteins.[10] Increased lutein and zeaxanthin intake from food sources or supplements have been shown to significantly increase the concentrations of these xanthophylls in the serum and macula.[7,11] The most recent supplementation studies evaluating the benefits of lutein and/or zeaxanthin on eye health have used 10 mg or more lutein per day.[7] This dosage is well below the 2 mg/kg acceptable daily intake (ADI) established by the Joint FAO/WHO Expert Committee on Food Additives (JECFA).[12] The ADI is a measure of the amount of a specific substance in food that can be consumed over a lifetime without an appreciable health risk. In addition, there are no reported toxic effects of long-term exposure to lutein and zeaxanthin from dietary sources or supplementation.

It is difficult to get all the critical eye nutrients from diet alone. In fact, many Americans have low concentrations of lutein and zeaxanthin in the macula because their diet is deficient in these nutrients. The average daily intake of lutein and zeaxanthin in the United States from diet alone is estimated to be less than 2 mg, far below intakes clinically proven to reduce the risk of certain age-related eye conditions.[13] Lutein and zeaxanthin concentrations in the macula naturally deplete as people age, so it is essential to maintain proper levels of these eye nutrients every day through dietary sources or supplements. Studies have shown that the bioavailability of lutein and zeaxanthin obtained from supplements and fortified foods is similar to that obtained from foods that naturally contain these nutrients.

Based on the information at hand, dietitians should encourage increased consumption of foods and beverages containing lutein and zeaxanthin. Although the vast majority of research subjects show an increase in lutein and zeaxanthin concentrations in the macula when increasing consumption of these carotenoids, some individuals show no response; this is likely due to a variety of factors, including study design, health of the retina, saturation of carotenoid binding proteins, and vehicle (food or supplement).[14] Furthermore, dietary supplements may benefit populations where consumption is generally low and individuals are either unable or unwilling to increase food intake in order to reach levels associated with eye health benefits. Supplementation of carotenoids often raises questions regarding the impact on related nutrients. While some studies suggest that high-dose carotenoid intake may competitively affect the absorption of some other carotenoids, the overall evidence is mixed.

"Nearly half of the American population—approximately 133 million individuals—may be at risk for developing AMD later in life."

Retinal Measurement of Lutein and Zeaxanthin

How are biological concentrations of lutein and zeaxanthin assessed? Over the past few years a number of methods for quantifying lutein and zeaxanthin macular tissue concentrations have been developed. These techniques use a surrogate optical indicator of xanthophyll concentrations in the eye: macular pigment optical density (MPOD). MPOD is the measurement of the ability of the macular pigment to absorb or filter blue wavelengths of light; it is linearly related to the amount of lutein and zeaxanthin in the macula. There are a number of different techniques for measuring MPOD, and optometrists are increasingly recognizing the importance of MPOD and offering this test in their offices.

Nearly half of all Americans have low MPOD, indicating low concentrations of lutein and zeaxanthin in the macula.[15] Lutein and zeaxanthin intake has been associated epidemiologically with a protective role against age-related macular degeneration. Therefore, low MPOD is a risk factor for AMD, meaning that nearly half of the American population—approximately 133 million individuals—may be at risk for developing AMD later in life. In addition, risk factors for AMD such as older age, female gender, obesity, tobacco use, and family history are associated with lower MPOD.[16] These associations suggest low MPOD may not confer enough protection against light-induced ocular damage, which over time may lead to increased risk of developing age-related eye conditions.

Lutein and Zeaxanthin and Visual Performance

More recently, research has established that the benefits associated with the blue light filtering and antioxidant properties of lutein and zeaxanthin extend beyond risk reduction of age-related eye conditions. Macular pigment has been shown to enhance visual function and comfort as well. These improvements in visual performance may be attributed to biological and/or optical mechanisms of the macular pigment. Biological mechanisms may enhance visual function by improving retinal health through absorbing high-energy blue wavelengths of light and inactivating reactive oxygen species. In addition, optical mechanisms, i.e., preferential absorption of blue wavelengths of light, may improve visual function. Thus, MPOD can potentially serve as a biomarker not only for predicting eye disease risk but also for assessing visual function and performance.

Glare Relief and Recovery

Blue wavelengths of visible light are scattered to a greater degree than longer wavelengths of light, and scattered light can produce glare and reduce contrast in the retinal image. When the glare source is intense and near the line of sight, it is known as "disability glare" because it can noticeably interfere with the visual task. Disability glare can present a significant hazard to drivers at night because of the bright light from oncoming headlights. Disability glare from the sun also can be a significant challenge for athletes and outdoor enthusiasts who rely on their vision to help them perform at their best.

Results from a recent study provide support that high levels of macular pigment reduce disability glare. Stringham and Hammond[17] evaluated the impact of oral supplementation with 10 mg lutein and 2 mg zeaxanthin daily for 6 months in 40 healthy subjects on levels of macular pigment, glare tolerance, and photostress recovery time. MPOD increased significantly from baseline after 4 months of supplementation. After 6 months of supplementation, the subjects' ability to tolerate glaring light improved 58% ($P < .0001$), and the time to recover sight following exposure to bright light (photostress) improved by 5 seconds or 14% ($P = .0003$). The improvements in glare tolerance and photostress recovery time correlated significantly with increases in macular pigment over the 6 months of supplementation.

These data suggest that lutein and zeaxanthin act as an optical filter to absorb wavelengths of light that reduce visual function. Such improvements in visual performance are important for anyone, especially athletes. Vision, like speed and strength, is an important component to performing at the highest level. Reducing recovery time from glare and enhancing visual function help provide a competitive edge.

Contrast Acuity

The optical properties of yellow intraocular filters were originally reviewed by Walls and Judd in 1933 based on the observation that these yellow filters (as opposed to red or green) are ubiquitous in nature.[18] Such intraocular filters would increase visual range and enhance contrast between an object and its background. The enhancement of visible range by macular pigment was described by Wooten and Hammond as the visibility hypothesis,[15] which postulates that macular pigment may improve vision through the atmosphere by preferentially absorbing blue haze (short-wave dominant air light that produces a veiling luminance when viewing objects at a distance).

The visibility hypothesis was modeled empirically, and it was determined that under ordinary daylight conditions subjects with high levels of macular pigment would be able to see about 30% farther in comparison to subjects with little or no macular pigment.[15] In a separate study, it was found that macular pigment enhanced contrast, as revealed by individuals with higher MPOD who were able to better distinguish objects, especially in low-light conditions.[19] These benefits regarding contrast acuity are significant to anyone who has ever struggled to see someone walking along a dimly lit street or has had difficulty picking out an object, such as a baseball, in the sky.

Conclusions

An accumulating body of evidence suggests that the presence of lutein and zeaxanthin in the macula are critical to both protecting the eye against damage from certain wavelengths of light and improving visual function through optical properties. It has been estimated that 43% of the U.S. population has low MPOD levels,[11,15] suggesting that almost half of

"Because it is often difficult to ensure adequate intake of these essential eye nutrients through diet alone, supplementation is a viable and convenient option…"

Americans do not consume sufficient amounts of lutein and zeaxanthin in their diet. Inadequate intake leads to reduced visual function, which for many may manifest as increased sensitivity to glaring light or decreased ability to distinguish objects clearly.

Recent studies indicate that low MPOD is a risk factor for AMD. Adequate intake of lutein and zeaxanthin is critically important to increase MPOD. Individuals can maintain adequate levels of lutein and zeaxanthin in the macula through increased consumption of fruits, vegetables, and healthful fats. Because it is often difficult to ensure adequate intake of these essential eye nutrients through diet alone, supplementation is a viable and convenient option for obtaining 10 mg of lutein and 2 mg zeaxanthin on a daily basis. Such dietary changes will help promote healthy vision and may make it possible for people to get closer to reaching their maximal visual performance

potential, which is especially important for athletes and fitness enthusiasts as they strive to achieve their maximal physical performance as well.

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SCAN'S PULSE 2009-2010 CPE Reviewers

The *SCAN'S PULSE* Editorial Board would like to acknowledge those who served as reviewers of our continuing professional education (CPE) articles during the 2009-2010 publishing year. Their review made it possible to offer SCAN members the opportunity to earn a total of four free CPE units from *PULSE* during this period. Our appreciation goes to:

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Influence of Vitamins E and C on the Recovery from an Anterior Cruciate Ligament Injury and Surgery

by Tyler Barker, PhD

Skeletal muscle dysfunction is a major cause of morbidity in a variety of pathophysiological and non-pathophysiological conditions. Muscle (i.e., quadriceps) dysfunction is a predominant impairment that commonly follows an anterior cruciate ligament (ACL) injury and surgery. Although attenuated mechanoreceptor feedback from a ruptured or surgically repaired ACL contributes to muscle weakness, it is probable that other pathophysiological mechanisms accentuate muscle weakness and atrophy following ACL reconstruction. Specifically, oxidative stress induces muscle weakness and atrophy in experimental animal studies.

Oxidative Stress and Muscle Dysfunction

Oxidative stress is defined as the imbalance between oxidants and antioxidants, in favor of the former, leading to a disruption in redox signaling and control and/or molecular damage.[1] Molecular oxygen and nitric oxide convert into a variety of reactive oxygen and nitrogen species that are capable of eliciting damage. The causative influence of oxidative stress on muscular weakness is well characterized in isolated muscle preparations and in experimental humans,[2] but it is unknown whether oxidative stress contributes to muscular weakness following an ACL injury and surgery.

Similar to muscular weakness, muscle atrophy is another predominant impairment that continues to challenge the recovery from an ACL injury and surgery. In experimental animal studies, oxidative (or nitrative) stress occurs during various forms of disuse atrophy.[3] The ability of vitamin E treatment (intraperitoneal or intramuscular injections) for diverse atrophy-inducing conditions[4-7] or for the maintenance of antioxidant defenses[8] to ameliorate oxidative stress and disuse atrophy establishes the fundamental basis that oxidative stress contributes to disuse atrophy, and that antioxidants or antioxidant supplementation could provide a complementary therapeutic approach to abrogate muscle atrophy. Unfortunately, the causative influence of oxidative stress in humans is unknown[9] and there are only a few studies that relate oxidative stress to disuse atrophy in humans,[10-12] with their results inconsistent.[13]

> "The injured limb displayed an approximate two-fold increase in muscular strength."

Vitamins E and C

Enzymatic and non-enzymatic antioxidant systems protect against the deleterious events or reactions mediated by reactive oxidative or nitrogen species. Vitamins E and C are potent dietary antioxidants. Vitamin C (ascorbic acid)[14] is a water soluble antioxidant that scavenges a variety of reactive oxygen and nitrogen species. Vitamin C is also a cofactor for collagen synthesis and recycles vitamin E. Vitamin E is a fat-soluble, chain-breaking antioxidant[15] that exists in eight different natural forms: four tocopherols (T; α-T, β-T, γ-T, and δ-T) and four tocotrienols (T3; α-T3, β-T3, γ-T3, and δ-T3). The most common supplemental form of vitamin E is α-T, while the predominant form of vitamin E in the American diet is γ-T, which is found, for example, in canola or rapeseed oil.[16,17] Nonetheless, because of the preferential hepatic secretion by the α-T transfer protein, the most abundant form of vitamin E found in plasma and tissues is α-T.

To date, there is little evidence identifying the therapeutic benefit of vitamin E and/or vitamin C on muscular strength following injury or surgery. Importantly, vitamins E and C relate to muscular strength and physical performance in the elderly,[16-18] a population that suffers from muscular weakness. With this in mind, we recently conducted a randomized, double-blind, placebo-controlled experimental design study involving patients undergoing elective ACL reconstructive surgery.[19-21] Patients received either an antioxidant (AO) supplement consisting of vitamins E (*RRR*- α-tocopherol, 400 IU/d) and C (1,000 mg/d) or a matching placebo (PL). Supplements were taken daily with a meal starting approximately 2-weeks prior to and concluding 3 months after surgery. Participants had not taken any supplements for 12 months prior to study enrollment. Several key results from this study are discussed below.

Correlation Between Plasma Ascorbic Acid Concentrations and Strength Gains

As expected, at study enrollment the injured limb was significantly weaker than the non-injured limb and it remained weaker at 3-months post-surgery.[20] Interestingly, strength gains in the injured limb that occurred from study enrollment to 3-months post-surgery correlated with plasma ascorbic acid concentrations measured at enrollment and prior to supplementation.[20] Although dietary

intakes of ascorbic acid were not assessed and no participants had taken any supplements one year prior to enrollment, this finding contentiously suggests that higher vitamin C intake prior to injury improves strength gains after surgery. While the causative influence of this association awaits future resolve, this finding identifies a compelling relationship between a potent dietary antioxidant and recovery from ACL surgery.

Correlation Between a Biomarker of Oxidative Stress and Muscular Strength Post-Surgery

Impairments in physical or muscular performance is a common consequence of aging, which among other factors is mediated by oxidative stress, speculatively. To investigate the relationship between muscular weakness and oxidative stress following ACL surgery, we examined the correlation between limb strength and a reliable in vivo biomarker of oxidative stress-induced damage (lipid peroxidation): plasma 8-isoprostane prostaglandin $F_2\alpha$ (8-iso $PGF_2\alpha$) concentrations.

The results showed that vitamin E and C supplementation was ineffective at lowering plasma 8-iso $PGF_2\alpha$ concentrations 3-months post-surgery. However, peak isometric force of the injured limb inversely correlated with plasma 8-iso $PGF_2\alpha$ concentrations in both groups (AO and PL) (Barker et al., unpublished observation) (see Figure). Thus, lowering oxidative stress might improve muscular strength after ACL surgery. It is plausible that our dose and duration of vitamin E supplementation were too low and short, respectively, to effectively decrease oxidative stress as measured in the circulation.[22] Nevertheless, this finding reveals the first association between oxidative stress and muscular strength following ACL surgery, and offers preliminary data for future translational- and clinical-based interventions intended to reduce oxidative stress and improve muscular strength following injury and surgery.

Influence of Vitamins E and C on Post-Surgery Strength Recovery

Although vitamin E and C supplementation did not lower a biomarker of oxidative stress-induced damage in the circulation, the results showed a tendency to improve muscle strength 3 months after ACL surgery. Compared with the non-injured limb, the injured limb displayed an approximate two-fold increase in muscular strength in the AO versus the PL group from study enrollment to 3 months post-surgery.[20] Although this finding did not reach statistical significance, it does provide preliminary and provocative evidence that vitamin E and C supplementation could act therapeutically during the recovery from ACL surgery. Whether supplementation augmented muscular strength or improved physical rehabilitative capacity that resulted in a faster recovery after ACL surgery warrants further investigation.

Influence of Vitamins E and C on Inflammatory Markers and Skeletal Muscle Calpain Following Limb Disuse

The patients in our study were non-weight-bearing on their injured limb the first 5 days after surgery.[19,20] We obtained muscle biopsies from the mid-vastus lateralis of the injured limb at two time points: 1) on the day of surgery but before any surgical procedures, and 2) prior to resuming weight-bearing activities after surgery. Mid-thigh circumference measurements (6-in above the mid-patella) of the injured and non-injured limbs were performed at

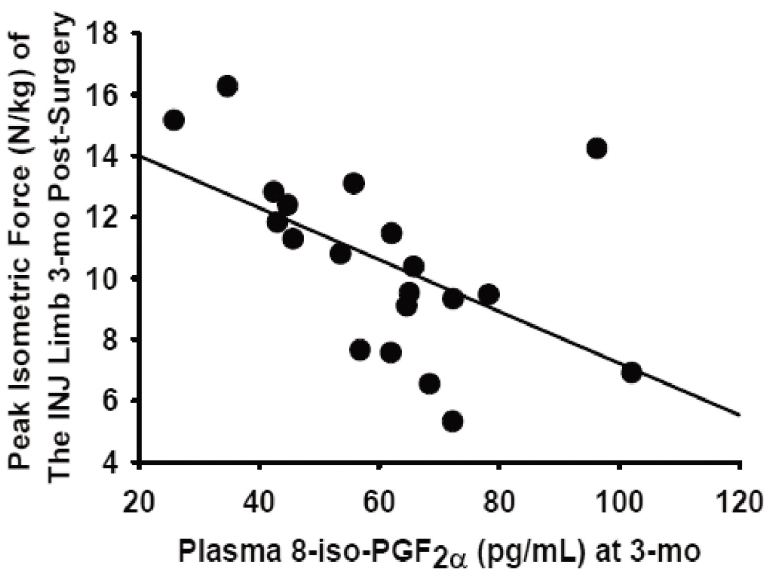

Figure Legend
Plasma 8-isoprostane prostaglandin $F_2\alpha$ (8-iso-PGF_2) concentrations (pg/mL) correlated ($r = 0.54$, $P = .02$) with peak isometric force (N/kg) of the injured (INJ) limb 3 months post-surgery for all subjects ($n = 20$) (Barker et al, unpublished observations). Single-leg peak isometric force measures were performed upon study enrollment and 3-months after surgery and supplementation on a customized horizontal plyo-press with mounted force plate. Peak isometric force measures were performed at 90° of knee and hip flexion. Plasma 8-iso-$PGF_2\alpha$ concentrations were measured in fasting blood draws obtained 3 months after surgery and supplementation. Plasma 8-iso-$PGF_2\alpha$ was measured in heparinized plasma samples using liquid chromatography/mass spectrometry. This finding suggests that lower oxidative stress concentrations in the blood associated with greater muscular strength after ACL surgery.

study enrollment (~2- to 3-wk before surgery) and approximately 8 days after surgery. Muscle fiber cross-sectional areas were not significantly different across time or between groups.[20] Mid-thigh circumferences of the injured limb were smaller than that of the non-injured limb at study enrollment and several days after surgery.[20] Therefore, based on circumference measures, the injured limb was smaller than the non-injured limb prior to surgery and prior to our pre-surgery biopsy.[20]

In the vastus lateralis muscle of the injured ACL limb several days after surgery, we found an increase in inducible nitric oxide synthase (iNOS) and myeloperoxidase (MPO) in subjects who supplemented with vitamins E and C.[20] Inducible nitric oxide synthase and MPO are inflammatory-derived sources of reactive oxygen and nitrogen species. In addition to increasing iNOS and MPO, vitamin E and C supplementation increased calpains following limb disuse after ACL surgery.[20] Calpains are cysteine proteases that release sarcomeric proteins for subsequent degradation by the proteasome. Importantly, calpain activation could be necessary for oxidative stress-induced muscle atrophy.[23] Thus, reducing oxidative stress could attenuate calpain activation and subsequently abrogate muscle atrophy. Nonetheless, despite increasing inflammatory markers and calpains in skeletal muscle, vitamin E and C supplementation did not accentuate muscle atrophy after ACL surgery.

Summary

Several novel findings were observed in our study that could have therapeutic implications on the rehabilitation from an ACL injury and surgery. First, plasma ascorbic acid concentrations prior to surgery and supplementation correlated with muscular strength gains after surgery, and a biomarker of oxidative stress-induced damage (i.e., lipid peroxidation) correlated with muscular strength 3-month post-ACL surgery. These results suggest that oxidative stress and antioxidants relate to muscular strength and strength recovery following an ACL injury and surgery. Second, vitamin E and C supplementation increased inflammatory mediators of reactive oxygen and nitrogen species and calpain without accentuating muscle atrophy. Finally, vitamin E and C supplementation tended to improve muscular strength. Although vitamin E and C supplementation was statistically ineffective at ameliorating muscle atrophy and weakness following an ACL injury and surgery, arguably, it is plausible that our dose and duration of vitamin E supplementation were too low and short, respectively, to induce its antioxidant properties.[22] Future studies investigating the therapeutic and causative influence of vitamins E and C at different doses and durations, along with other antioxidants, following an ACL injury and surgery are clearly warranted.

"This finding reveals the first association between oxidative stress and muscular strength following ACL surgery …"

Tyler Barker, PhD, is a physiologist at The Orthopedic Specialty Hospital. His research focus is developing complementary and alternative therapeutic approaches that attenuate muscular weakness and atrophy in various pathological and physiological conditions in humans.

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Worksite Health Promotion: Beyond "Biggest Loser" Challenges and T-Shirts

by Marisa Moore, MBA, RD

Worksite-based health promotion, also called worksite or corporate wellness, is a hot topic these days. The health promotion industry has hit a boom in a major way, and it goes beyond the ubiquitous "biggest loser" contest and t-shirt incentive. Today worksite health programs encompass a variety of integrated strategies and interventions in the workplace to help manage and control chronic disease, overweight, and obesity—and ultimately improve the company's bottom line savings on health care. Programs can range from an assortment of "lunch-and-learn" classes and the occasional health screening to a comprehensive program that includes integrated health education, a supportive social and physical environment, an employee assistance program (EAP), and regular worksite health screenings.[1]

The number and breadth of worksite wellness programs in the United States have increased substantially over the past two decades. In 1985, only 66% of companies with 50 or more employees offered at least one health promotion activity to employees. This grew to 81% by 1992 and to 90% by 2002.[1] Obesity—a top health concern in the nation—accounted for an estimated $147 billion in health care expenses in 2008. This is especially eye-catching to employers, because medical expenses for an obese employee are estimated to be 42% higher than for a person at a healthy weight.[2]

One reason for the increase in worksite health promotion is the combined trend that as Americans are spending more time in the workplace, employers are recognizing an opportunity to help reduce the incidence of some major medical conditions and therefore lower health care expenditures. In addition, with onsite health screening and assessments taking a deeper look at employees' health status, employers are discovering the health risks that diminish productivity, increase health care expenditures, and negatively impact the company's bottom line.[3]

In remarking on the growth of worksite wellness programs, Jennifer Price, RD, CWPC, wellness consultant for Willis North America, states: "After ex-

hausting a variety of short-term solutions such as switching medical carriers, changing contribution strategies, and tweaking plan design, employers are now facing the only long-term solution left—to improve the health of the employee population to reduce health risks and costs." Indeed, a focus on reducing and preventing obesity in the workplace is time well spent to help lower health care costs, decrease absenteeism, and improve productivity overall.

Influence of Health Care Reform

The health care reform legislation passed in 2010 may ignite further interest in worksite wellness activities. Providing a major emphasis on health promotion, the new law will authorize a variety of new programs for prevention and wellness. A few ways in which employers will be incentivized include:[4]

- Small employer corporate wellness grants to explore and implement worksite wellness programs
- Premium discounts for employees who participate in wellness programs
- Subsidies for small employers to provide health insurance coverage to employees
- Tax credits for up to 35% of health insurance costs

What's Needed for a Successful Program

As previously noted, worksite wellness activities run the gamut, from lunch-and-learn seminars to comprehensive programs. Most organized programs begin with a health risk assessment (HRA). While the HRA is essential for program success, the assessment alone is ineffective in producing behavior change and risk reduction.[5] For the best outcomes, interventions should be multifaceted and meet the following criteria: 1) include timely feedback on HRA results as well as programs to educate the employee on health risks, 2) provide opportunities for skill building and the tools to achieve behavior change; 3) motivate employees; and 4) implement opportunities at work to support healthful habits (e.g., provide healthful cafeteria and vending machine options, encourage biking, provide walking routes).

Other key elements are needed to implement and sustain a successful worksite wellness program, beginning with finding the right provider to deliver results.[6,7] Common components noted in a review of effective programs[5] include:

- Organizational commitment (leadership buy-in and support)
- Incentives for employees to participate
- Effective screening and triage
- State-of-the-art theory and evidence-based interventions (via a variety of offerings such as fitness centers; programs targeting weight management and cardiovascular health; and clean commuting support such as lockers, showers, and bicycle rack to encourage participation)
- Effective implementation (including targeting high-risk employees; ensuring program accessibility [via Internet, onsite, or telephone]; and communicating effectively)
- Ongoing program evaluation

When all components are in place, organizations have a better chance of achieving high participation rates. This can work to improve the health and well-being of employees as well as improve the company's financial picture. Direct health care cost savings of as much as 3% have been achieved with participation rates of at least 90%, although this savings is atypical in the current climate. Indirect health savings for productivity are estimated to be even higher.[8]

Bright Future for Registered Dietitians

The registered dietitian has an essential role in delivering effective worksite health promotion programs. This role extends far beyond lunch-and-learns. RDs with strong business acumen can fully manage worksite-based interventions to improve the health of employees. Those who understand the impact of health and wellness programs on corporate finances can go far.

In addition to serving as in-house food and nutrition experts, RDs can become involved in the design and delivery of many other opportunities, including:

- Comprehensive worksite health programs
- Workplace and cafeteria education programs
- Cooking demonstrations
- Guidelines for healthful food at meetings, seminars, and catered events

Resources for Practitioners in Worksite-Based Health Promotion

CDC LEAN Works (Leading Employees to Activity and Nutrition)
http://www.cdc.gov/LEANWorks
Includes an obesity cost calculator to calculate a company's return on investment (ROI); statistics and research; case studies; and other resources to help practitioners establish a worksite wellness program

Health Enhancement Research Organization (HERO) Scorecard (Best Practice Scorecard)
www.the-hero.org/scorecard.htm

Health Reform Website
www.healthreform.gov

National Business Group on Health (NGBH) Wellness Scorecard
www.businessgrouphealth.org

National Institute for Occupational Safety and Health (NIOSH) Essential Elements for Effective Workplace Programs
www.cdc.gov/niosh/worklife/essentials.html

Nutrition Entrepreneurs Dietetic Practice Group
www.nedpg.org

- Recipe and menu development
- Staff training
- Web-based solutions that include nutrient analysis of menu items and healthful promotions
- Fit business tips
- Workplace breastfeeding/ lactation programs

Health promotion programs can take place in a wide variety of settings, including corporations, manufacturing facilities, schools, clinics, hospitals, supermarkets, military bases, recreational centers, fitness centers, and all levels of government (federal, city, state, and county). Employment arrangements include positions that are full time, part time, or offered to an independent contractor for special projects. With more than 6 million firms in the United States, there are numerous opportunities for well-trained RDs.[9]

One key avenue for dietitians involves educating employers (small or large) on the value of employing an RD to take the lead in providing the solution. Dietitians need to be able to convince employers that hiring an RD will yield a good return on investment and that the RD is the best provider for the job. "Decision makers for health promotion services often don't have a health background," says Denice Ferko-Adams, MPH, RD, president and owner of Wellness Press. "Dietitians need to make corporations aware of how they can fit into an overall wellness plan and why they are the ideal leader for a health promotion team." Agreeing with this advice, wellness consultant Price notes that she has seen many unqualified practitioners approach employers with "free" services and presentations as a way to sell services and products such as nutrition supplements.

Skills and Competencies Needed in Worksite Wellness

The key skills needed for success in wellness settings involve communication, nutrition assessment and counseling, motivation/facilitation of change in behavior, evaluation of individual success, use of technology, and evaluation of program success and promotional activities.[10] This bodes well for RDs, because many of the top essential skills in worksite health promotion are core competencies in dietetics education programs.

"Employers are challenged to implement best practices, and RDs are well positioned to fill the gap."

To be highly competitive in the health promotion industry, RDs are also encouraged to pursue training in areas beyond dietetics and obtain certifications from other professional groups, such as the American College of Sports Medicine. "RDs trained in motivational interviewing and those who have completed a certified coaching program are ideal," says Price. Such providers tend to thrive in the worksite wellness setting. Acquiring this skill set also matches the current employer trend toward customized behavior change programs and health coaching.

What's Next?

The corporate wellness industry is poised for growth in the next few years as employers seek solutions to help lower health care costs. Employers are challenged to implement best practices, and RDs are well positioned to fill the gap.

Marisa Moore, MBA, RD, is employed by CSC and manages the nutrition worksite wellness program for employees at the Centers for Disease Control and Prevention (CDC) in Atlanta, GA. She is an ADA national spokesperson and the immediate past president of the Georgia Dietetic Association.

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From The Chair

Student Engagement: Nurturing SCAN's Passion, Ensuring a Bright Future

by Tara Coghlin-Dickson, MS, RD, CSSD

A most impressionable experience early in my career was when an RD engaged me, serving as an architect to help create the environment in which I was soon to work and love. She gave me some of her time and afforded me access to a professional world I thought I wanted to be a part of. Having direct contact with a nutrition professional working in my field of interest was of immeasurable value. The mentoring served as a determining factor for my career direction. She realized she had a shared responsibility in the task of student learning. Her interest was in being a part of the bigger picture by engaging in a student's growing environment to strengthen a shared passion and profession.

Just as this RD extended an invaluable service to me, SCAN's mission supports empowering its members to provide purpose, authenticity, and relevance to student learning. For example, the SCAN Mentoring Program experience is one of a kind and a vital contribution to the student community. Another connection with student members is hosting a discussion on the online Student Community of Interest (CoI); through the efforts headed by our director of member services, SCAN's own experts have participated with great success. Writing articles for the *ADA Student Scoop* is another excellent outreach opportunity.

Student engagement is a powerful and essential means of developing SCAN's passion. Playing a part in it and witnessing growth firsthand serves us all as a wise investment. We can all make student engagement significant, valuable, and real—we can make learning a creation of meaning and action.

SCAN's student opportunities include:

- Local student assistance at the Annual SCAN Symposium
- Free 2011 Symposium registration for a limited number of accepted posters from SCAN student members
- Volunteer roles that match students with experienced leaders—and facilitate a fast track to success
- Ability to focus on specific areas of interest and skills through student subunit volunteer positions
- Opportunity to contribute to developing fact sheets
- SCAN Mentoring Program
- Social media for published research
- Student recognition and leadership development
- Coming soon: SCAN student grants

Student members of SCAN can tap into a network of information, resources, and national nutrition experts—all at a special, affordable student membership rate. Through SCAN's newly revamped Web site, student members can engage in the three listservs, Twitter, Facebook, Discussion Forums, LinkedIn, and the Student Corner. Student support on the Web site also includes student career path information, including lists of graduate schools and internships.

Clearly, student engagement is no longer an option—it's an expectation. Student engagement is the key to our future. Through SCAN opportunities, students and experienced SCAN professionals work together in this meaningful way to become innovative, collaborative, and future leaders. Be a part of small changes—engage and make an impact!

Conference Highlights

American College of Sports Medicine Annual Meeting

June 1-5, 2010
Baltimore, MD

The American College of Sports Medicine is the largest sports medicine and exercise science organization in the world, with more than 35,000 international and national members and certified professionals. ACSM is dedicated to advancing and integrating scientific research to provide educational and practical applications of exercise science and sports medicine. At 2010 ACSM Annual Meeting, more than 5,400 exercise scientists, sports dietitians, physicians, and health professionals gathered to share the latest research. Shown here are a few of the nutrition highlights. Abstracts of the presentations appeared in the supplement to the May 2010 issue of *Medicine and Science in Sports and Exercise*. Additional highlights are available at www.acsm.org (click on "news releases").

Weight Loss and Management

- What are four keys to weight loss success? In a study involving 65 overweight or obese men, the keys to successful weight loss were choosing smaller portions, cutting back on sugary soft drinks, eating fewer high-fat snack foods, and consuming less alcohol (Abstract 647).
- Marathon training is not a good way to lose weight, according to a study of 64 participants in a 3-month marathon training program. Only

11% of participants lost weight, another 11% gained weight, and the rest remained stable. Of the 7 who gained weight, 6 were women. In general, 74% of the women reported eating more while training, compared with only 48% of the men. The goal of running should be to improve performance, not to lose weight (Abstract 2436).

■ In investigating whether it matters to lose weight quickly or slowly, researchers found that the pace of weight loss was not important over the long run. Whichever way athletes lost weight, they returned to the same weight a year later. However, slow weight loss tends to preserve more muscles mass (Abstract 641).

■ Among athletes who need to make weight for a sport, will self-dehydrating to shed some pounds hurt their performance? In a study with boxers who sweated off 2% of their body weight, the boxers were able to maintain their performance as well as normal liver and renal function. However, heatstroke was a concern (Abstract 1680).

■ Why don't obese people exercise? Based on a survey of overweight/obese collegiate students, faculty, and staff, two major reasons are "exercise is hard for me" and "exercise takes too much of my time." Helping this population with time-management skills might be a smart strategy (Abstract 2259).

■ Walking up stairs can burn about 10 kcal per minute, while taking the elevator burns only about 1.5 kcal per minute. Motivational signs that encouraged people to take the stairs instead of the elevator increased stair usage from 51% to 60%, suggesting a clear need for more signs (Abstract 2526).

■ Body fat measurement using the Bod Pod has been shown to be a valid and reliable method to measure body composition, yet researchers are finding potential sources of error that can result in a lower estimate of body fatness. One source includes body hair on the arms and legs. A study involving 20 men who were measured under four conditions (body hair, body hair covered with nylons, shaved with nylons, and shaved) reported significant differences between the test results. More research is needed before any specific recommendations can be made regarding arm and leg hair (Abstract 2441).

■ Skinfold calipers maintain a high ranking as a tool for measuring body composition. A study involving 50 Caucasian men and women that rank-ordered techniques using underwater weighing as the gold standard indicated the sum of four skinfolds (Jackson-Pollack) correlated highest, followed by Bod Pod, dual energy X-ray absorptiometry, ultrasound, and bioelectrical impedance analysis (Abstract 2439).

Physical and Mental Energy

■ Fatigue is associated with not just depleted muscles but also a tired mind. Inhibitory mechanisms in the brain can contribute to a 25% reduction in muscle contraction. Caffeine might be able to help counter the fatigue (Abstract 732).

■ During rest, caffeinated drinks (with or without sugar) contribute to 12% greater ratings for mental energy compared with plain water (Abstract 1904).

Fueling Before and During Exercise

■ Consuming protein, such as yogurt, before lifting weights may enhance recovery better than consuming a protein recovery drink afterwards (Abstract 2862).

■ Cyclists and triathletes who consumed 60 to 80 g carbohydrate per hour (240-320 kcal/h) performed better during a 2-hour endurance ride followed by a 20-minute time trial than those who consumed 10 to 50 g or 90 to 120 g carbohydrate per hour. Each athlete should experiment with different doses of carbohydrate during training to learn the right dose for his/her body (Abstract 855).

Recovery Drinks

■ Fat-free chocolate milk is an excellent recovery drink. It stimulates muscle building (Abstract 794) and reduces muscle breakdown (Abstract 1135). Chocolate milk also replaces glycogen faster than a protein-free drink (Abstracts 862 and 2816).

■ When compared with a placebo (matched for color, taste and carbohydrate content), antioxidant-rich pomegranate juice improves recovery and decreases muscle soreness after muscle-damaging exercise in trained men (Abstract 1931).

Fluids and Hydration

■ Is coconut water preferable to a sports drink for replacing sweat losses? While it is as effective as a sports drink in replenishing body fluids, coconut water lacks taste appeal. The athletes in a study evaluating these drink preferred the standard sports drink. A fluid is only helpful if it is consumed (Abstract 2289).

■ During an hour of simulated bike racing, Ironman triathletes lost about 1.5 L of sweat and drank about 0.5 L too little fluid to replace that loss. Although they were able to perform well for the 1-hour exercise test, medical problems would arise if they were to exercise for 14 hours with a similar fluid deficit (Abstract 940).

■ After hard exercise, is it better to drink a large amount of water at one time to replace sweat losses—or smaller amounts of water every 30 minutes for 4 hours? Either works; the important thing is to consume 150% more than what was lost via sweat. Athletes who know their sweat rate have a helpful tool to manage hydration (Abstract 2290).

■ Staying well hydrated on a daily basis is important to optimize performance, and winter athletes commonly need to be taught to drink more throughout the day. Urine samples of high school alpine skiers indicated that 11 of 12 were dehydrated pre-competition (Abstract 1149).

■ A survey of National Collegiate Athletic Association hockey players indicated that they arrived at practice under-hydrated and ended the exercise session with an even larger fluid deficit. Cumulative dehydration can take its toll on performance (Abstract 2484).

■ A study involving racing cyclists compared the effects of consuming two caffeinated beverages (Red Bull Energy Drink versus Coca-Cola with extra caffeine to match the 160 mg caffeine in Red Bull) 55 minutes prior to a 25-mile simulated road race. The cyclists performed similarly with Red Bull and Coke. Caffeine and sugar are popular energizers among athletes (Abstract 2457).
■ Among 51 cyclists who participated in the Hotter 'N Hell Hundred bike event in Texas, two became hyponatremic. In comparison to the other cyclists, they had higher sweat rates and higher fluid intakes. They also finished faster than many others. Interestingly, one had a high sodium intake and one a lower intake, but they both ended up with hyponatremia (Abstract 2487).

Iron Deficiency Anemia

■ The incidence of iron deficiency anemia in the general population of men is 2%. A survey of male cross country and distance runners aged 18 to 22 years found that 21% of the men were iron deficient—10 times greater than expected (Abstract 2821).
■ The incidence of iron deficiency anemia is 14% in the general population of women but about 50% among female athletes. Researchers found that taking an iron supplement for the 7 days during menses helps maintain a strong iron status (Abstract 2822).

Benefits of Exercise

■ Persistent fatigue affects 96% of cancer survivors. Low-intensity exercise (cardiovascular and lifting) can reduce fatigue. Cancer patients can benefit from participating in supervised exercise programs (Abstract 1414).
■ Among 269 cancer patients who exercised for at least 3 months, the cancer survival rate was 93%. This is higher than the national average of 66%. In the breast cancer group, exercisers have a 95% survival rate compared with the national average of 89% (Abstract 1635).
■ Although physical education classes seem to be the easiest to cut during a budget crisis, the reality is that students who are physically active perform better on standardized achievement tests. What's good for the body is good for the brain (Abstract 2148).
■ Strength training is key to having lean muscle pull on bones. This can help stop the development of osteoporosis (Abstract 2664).
■ Athletes with anorexia would be wise to do resistance exercise. Having strong muscles pulling on bones can enhance bone strength and potentially reduce the risk of stress fractures (Abstract 2650).
■ Loss of bone density affects men as well as women. A survey of 35-to-50-year-old men and women revealed that 42% of men and 28% of women had low bone mineral density. These shocking results indicate that men as well as women need to take steps to maintain their bone health and reduce their risk for developing osteoporosis (Abstract 2657).
■ NHANES (National Health and Nutrition Examination Survey) information from 5,618 people suggests those who do muscle-strengthening exercises are 28% less likely to have dyslipidemia than those who do not. Strength training twice a week is important in maintaining good health (Abstract 2385).
■ Physical activity can help older adults (ages 60-99 y) maintain their youthfulness. Because women tend to be more active than men, they experience less physical decline (Abstract 2347).

Contributed by Nancy Clark, MS, RD, CSSD, who is PULSE's *"Conference Highlights" editor and has a private practice at Healthworks in Chestnut Hill, MA, where she counsels both casual and competitive athletes.*

Reviews

Savor

Thich Nhat Hanh and Lilian Cheung, DSc, RD
HarperOne, Harper Collins Publishers, 10 East 53rd St., New York City, NY 10022
www.harpercollins.com
2010, hardcover, 292 pp, $25.99,
ISBN 978-0-06-169769-2

Savor offers a thorough exploration of the interconnected relationships between psychological, emotional, physical, and behavioral approaches to weight loss. Advocating a mindful living approach that involves what the authors refer to as *In*Eating, *In*Moving, and *In*Breathing, Thich Nhat Hanh and Dr. Lilian Cheung focus on Buddhist meditations and teachings of mindfulness to practice living *in* the present moment—transforming habitual and mindless actions that inhibit weight loss.

The book is divided into three parts. Part I: A Buddhist Perspective on Weight Control offers a fundamental primer on Buddhist teachings as the authors describe the practice and importance of mindfulness and offer insight into how and why we develop thoughts, emotions, and habitual behaviors. Readers learn how the Four Noble Truths apply to weight loss and are encouraged to get in touch with their bodies, emotions, environment, and behaviors to develop a personal "mission statement for healthy weight and well-being."

Part II expands upon these teachings to describe "mindful action plans." Through a series of questions and examples, the authors encourage readers to reflect upon their own barriers to mindful eating and exercise to create a 10-week mindful living plan that incorporates specific goals for approaching eating, moving, and

breathing with mindful and present intention.

In Part III: Individual and Collective Effort, the authors identify the interconnectedness of individuals with their surrounding social environment, physical environment, and society. Taking one day at a time, students of this mindful living approach are encouraged to work at the grassroots level to develop support groups, incite change in the food supply, and promote access to healthful physical activity.

With few exceptions, namely its approach to alcohol and meat consumption, which are strongly influenced by the rigidity of Buddhist teaching, the diet and exercise guidelines in this book reference scientifically supported recommendations of the Centers for Disease Control, American Heart Association, American College of Sports Medicine, Harvard School of Public Health, and the federal government's guidelines for diet and exercise.

This book offers a great resource for the psychologically focused practitioner. Therapists and dietitians who often apply the concepts presented in such books as *Intuitive Eating, Mindless Eating,* and *The End of Overeating* will find that *Savor* offers a more advanced approach to the art of mindfulness and its transformative power. The wisdom of Zen master Thich Nhat Hanh and the skill of Dr. Cheung in translating science into practice deliver concrete meditations and practices that may prove useful for individuals in need of weight loss as well as those with an eating disorder.

For those not familiar with the concept of mindfulness, this book may not be the most approachable introduction to this idea. However, *Savor* presents an essential, multifaceted approach to weight loss: making the mental and physical connections necessary to tackle obesity. Research shows that lifestyle change is essential to achieving a healthful weight, but creating that change can be complicated and difficult. The mindful approach presented in this book works with readers from "the inside out." Starting with self-evaluation and meditation, the book guides readers to make external changes (i.e., changes to eating and exercise habits) along with internal reflections on why, what, where, when, and with whom they engage in eating, moving, and breathing. *Savor's* connection between our external environment and our internal feelings is an integral approach to making lifestyle changes, achieving a healthful relationship with food and exercise, and sustaining weight loss.

Known as Thay by his students, Thich Nhat Hanh is one of the world's most renowned and respected Zen masters. Grounded in the Buddhist principles of nonviolence and compassion, Thich Nhat Hanh has organized grassroots efforts to promote peace and improve community welfare around the world. He has published scores of inspirational poems, essays, and prayers and lives in Plum Village, the meditation community he founded in France in 1982.

Dr. Lilian Cheung is an expert at translating nutrition science into accessible resources for the community. As the director of health promotion and communication and editorial director of the Nutrition Source Web site of the Harvard School of Public Health, Dr. Cheung is skilled in the art of using mass media to improve the quality of nutrition messaging and promote healthful lifestyles across multiple demographics.

Reviewed by Kristine Spence, MS, RD, CD, sports dietitian and researcher at the Orthopedic Specialty Hospital (TOSH) and adjunct faculty member at the University of Utah, in Salt Lake City, UT.

Sports Dietetics-USA Research Digest

Antioxidant Supplementation and Endurance Training Adaptation

Yfanti C, Akerström T, Nielsen S, et al. Antioxidant supplementation does not alter endurance training adaptation. *Med Sci Sports Exerc*. 2010;42: 1388-1395.

Reactive oxygen and nitrogen species production that occurs with exercise may negatively impact performance; however, this same process appears to be critical in stimulating desired training adaptations. The purpose of this study was to investigate whether vitamin C and E supplementation during endurance training attenuates the expected increases in training adaptation and performance in physically active men. In this 12-week, double-blind, placebo-controlled study, 21 men (ages 18-40 y) completed a 5-day-per-week intensive cycle training protocol. Eleven participants received 500 mg vitamin C and 400 IU vitamin E daily for 16 weeks (AO group); the remaining 10 participants received placebo tablets (PL group). Plasma levels of vitamin C and E were monitored along with dietary intake. Performance and oxidative capacity were assessed using aerobic and metabolic parameters that included maximal oxygen consumption (VO_2max), maximal power output, workload at lactate threshold, skeletal muscle glycogen content, and mitochondrial enzymes (citrate synthase and beta-hydroxyacacyl-CoA dehydrogenase). Plasma levels of vitamins C and E increased significantly ($P<.05$ and $P<.001$ respectively) in the AO group and remained unchanged in the PL group. Both groups had significant improvements from baseline in the aerobic and

metabolic parameters ($P < .01$), but no significant difference was detected between groups. The results of this study indicate that vitamin C and E supplementation does not attenuate training adaptation or improve performance in physically active men. In conclusion, athletes with normal vitamin C and E status will most likely experience neither positive nor negative effects secondary to antioxidant supplementation. This study was funded by a grant from the Danish National Research Foundation, the Danish Medical Research Council, the Commission of the European Communities, the Greek State Scholarships Foundation, and the Danish Ministry of Culture Committee on Sports Research.

Summarized by Ladd Harris, graduate student, Coordinated Master's Program, Sports Dietetics Emphasis, Division of Nutrition, University of Utah, Salt Lake City, UT.

Effects of Caffeine and Carbohydrate on Soccer Performance

Gant N, Ali A, Foskett A. Influence of caffeine and carbohydrate coingestion on simulated soccer performance. *Int J Sport Nutr Exerc Met*. 2010;20:191-197.

Taken individually, caffeine and carbohydrate (CHO) have been shown to be ergogenic for prolonged endurance and high-intensity intermittent exercise. However, the coingestion of caffeine and CHO on exercise performance is unclear. The purpose of this study was to examine the effect of a caffeinated CHO solution on prolonged soccer activity. In this randomized, double-blind, crossover study, 15 male premier-grade soccer players ingested 8 mL/kg body weight (BW) of a 6% CHO beverage (1.8 g/kg BW CHO) with 160 mg/L caffeine (CAF; 3.7 mg/kg BW) or without caffeine (CON) one hour pre-exercise and 3 mL/kg BW every 15 minutes during exercise. After familiarization with testing protocols, study participants completed two exercise trials separated by 7 days. Exercise trials consisted of 90 minutes of intermittent shuttle running (15-minute exercise bouts separated by 4-minute rests), countermovement jumps (CMJ) during rest periods, and soccer passing tests. Heart rate, blood lactate, perceived activation, and rating of pleasure/displeasure were measured before and during exercise. Mean 15-minute sprint time was significantly faster ($P < .04$) with CAF versus CON (2.48±1.15 vs. 2.59±0.02 sec during the final sprint). Explosive leg power (CMJ height) ($P < .03$), heart rate ($P < .01$), and rate of pleasure ($P < .01$) were also significantly higher with CAF than CON. There were no differences in blood lactate, body weight loss, perceived activation, or thirst drive. The results of this study suggest that coingestion of CHO and caffeine may have an ergogenic effect on leg power and sprint performance. Athletes engaging in high-intensity intermittent sports may benefit from consuming a moderately caffeinated sports drink.

Summarized by Kate Olsen, graduate student, Coordinated Master's Program, Sports Dietetics Emphasis, Division of Nutrition, University of Utah, Salt Lake City, UT.

Fat-Free Milk Consumption and Changes in Body Composition

Josse, AR, Tang JE, Tarnopolsky MA, et al. Body composition and strength changes in women with milk and resistance exercise. *Med Sci Sports Exerc*. 2010;42:1122-1130.

Ingestion of milk-based protein following intensive resistance training appears to enhance muscle mass accretion in young males. Whether females following the same regime respond similarly has not been sufficiently tested. The objective of this study was to determine if ingestion of fat-free milk or an isocaloric carbohydrate (CHO) drink resulted in greater strength gains and increases in lean muscle mass following 12 weeks of resistance training in young, healthy women. Prior to the study, participants were recreationally active but not recently engaging in resistance training. In single-blind, randomized fashion, female participants consumed either 500 mL fat-free milk (MILK; n=10) or a 9% isocaloric maltodextrin beverage (CON; n=10) immediately following and 1 hour after resistance training. Study participants performed a whole-body split routine 5days per week alternating pushing, pulling, and leg exercises at 80% one repetition maximum (1-RM). Body composition via dual energy X-ray absorptiometry scan and 1-RM testing were performed at pre- and post-training. The MILK group experienced both a decline in fat mass ($P < .02$) and increase in lean mass compared with the CON group ($P < .01$). Increases in 1-RM were observed in both groups for all exercises at post-training, with a significant increase in the bench press exercise for MILK subjects compared with CON subjects ($P < .05$). The results of this investigation indicate that post-exercise ingestion of fat-free milk appears to favorably alter body composition in young women following a resistance exercise training program. Ingestion of fat-free milk may provide a practical, inexpensive recovery drink for increasing lean mass in women. This study was supported by grants from the Natural Science and Engineering Research Council of Canada, the Canadian Institutes of Health Research, and the Dairy Farmers of Canada.

Summarized by James R, Stevens, MS, RD, adjunct instructor, Metro State College of Denver, CO.

Combined Effect of Omega-3 Fatty Acids and Antioxidants on Oxidative Stress

McAnulty SR, Nieman DC, Fox-Rabinovich M, et al. Effect of n-3 fatty acids and antioxidants on oxidative stress after exercise. *Med Sci Sports Exerc*. 2010;42:1704-1711.

Omega-3 fatty acids (n-3 FA) are potentially beneficial due to their

anti-inflammatory, antithrombotic, and vasodilatory properties. However, n-3 FA may contribute to lipid peroxidation, an effect possibly attenuated with increased antioxidant intake. The objective of this study was to determine the effects of omega-3 fatty acid and antioxidant supplementation on F_2-isoprostane formation, a marker for oxidative stress, in endurance athletes. Forty-eight male and female trained cyclists were randomized into one of four groups: vitamin-mineral (VM), n-3 FA (N3), vitamin-mineral and n-3 FA (VMN3), or placebo (P) ingested in double-blind fashion for 6 weeks. The N3 supplement provided 2,000 mg eicosapentaenoic acid (EPA) and 400 mg EPA; the VM supplement provided 2,000 mg vitamin C, 800 IU vitamin E, 3,000 IU vitamin A, and 200 mcg selenium. At the end of 6 weeks supplementation, participants completed 3 consecutive days of cycling training for 3 hours at 57% maximum wattage. Blood samples were obtained at baseline (0 wk), pre-exercise, and after the last training session for measurement of F_2-isoprostanes. At post-exercise, the N3 group experienced a significant increase (53%) in F_2-isoprostanes compared with pre-exercise levels; this was significantly different from the P (P=.02), VM (P=.008), and VMN3 (P=.05) groups. VM supplementation did not significantly decrease F_2-isoprostane formation compared with P. Based on the results of this study, supplementation with n-3 FA may contribute to oxidative stress via observed increases in F_2-isoprostanes. This potentially adverse effect may be in part negated by antioxidant supplementation. However, when ingested alone, antioxidants do not elicit further decreases in oxidative stress. Athletes should be advised on the potential for increased oxidative stress with n-3 FA supplementation. This project was funded by the Cooper Aerobics Center, Dallas, Tex.

Summarized by James R Stevens, MS, RD, adjunct instructor, Metro State College of Denver, CO.

SCAN Notables

by Sumner Brooks, MPH, RD

■ **Julie Upton, MS, RD, CSSD,** survived on burgers, Cheese-Its, and Swedish Fish during her first ultra-endurance running event, the Gore-Tex Trans Rockies Run. This 6-day run covered more than 115 miles of terrain in Colorado, involved over 25,000 ft of climbing in elevations well over 10,000 ft, and required technical single-track trails. Along with her teammate, Julie finished the run without incident and looks forward to repeating the challenge in the future. Julie is a nutrition communications specialist focusing on consumer print and broadcast media in Tiburon, CA.

■ Founder of Nutrition for Body and Mind, **Courtney Walberg, RD, NASM-CPT**, recently earned her personal training certification through the National Academy of Sports Medicine. Courtney combines her nutrition and personal training skills to author the online nutrition content for "House Call MD" and develop workouts for active individuals of all ages. Her focus is on making exercise fun and mixing in outdoor workouts as alternatives to the gym. In addition to her online work, Courtney is in private practice at a gastroenterology clinic and an inpatient RD at Olympia Medical Center in Los Angeles, CA.

■ **Roberta Wennick, MS, RD,** has fulfilled her 20-year old dream to create an interactive recipe-building Web site, www.Spin-A-Recipe.com. For just one basic recipe, the Web site creates dozens of healthy variations. In addition to her latest online publication, Roberta has authored two books: *Is Your Personality Type Making You Fat?* and *Drawing the Line on Calories, Carbs, and Fat*. A nutrition consultant, culinary nutritionist, and freelance writer based in Lynnwood, WA, Roberta also runs a private nutrition counseling website called Advantage Diets (www.advantagediets.com).

■ The first recipient of the SCAN scholarship award in 1986**, Susan Weiner, RD, MS, CDE, CDN,** has since established a successful private practice in New York as a dietitian and exercise physiologist. Susan is a contributing medical producer for dLife (For Your Diabetes Life) TV and serves on dLife's prestigious medical advisory board. She is also a nutritionist and certified diabetes educator for the TheBestLife.com (Bob Greene's health and weight loss Web site). Currently she is co-authoring a chapter on anemia for the upcoming edition of *Krause's Food, Nutrition & Diet Therapy* text book.

■ **Kim Crawford, PhD, RD, CSSD,** has been appointed as the American Dietetic Association representative to the U.S. National Physical Activity Plan (NPAP). In this role Kim attended the NPAP national launch in Washington, DC, in spring 2010 and will be working in cooperation with the public health sector to develop and update the NPAP as the plan progresses. Kim is the coordinator of graduate studies in nutrition at the University of Pittsburgh, PA. She served an integral role in the development of the Board Certified Specialist in Sports Dietetics (CSSD) exam.

If you have an accomplishment that you would like to be considered for an upcoming issue of PULSE, please contact Sumner Brooks, MPH, RD, at Sumner_brooks@yahoo.com.

# of Further Interest

■ Cast Your Vote for SCAN Leaders

Be sure to participate in the upcoming election for SCAN leaders. Once again, SCAN will use an electronic ballot. To vote online, go to SCAN's Web site (www.scandpg.org) and on the home page, click on the link that says "2011 Election Ballot." Online voting polls open **February 1, 2011**; the final date to vote is **March 3, 2011.**

■ Take a Look at SCAN's Annual Report

SCAN's Annual Report for fiscal year 2009-2010 is now available online. The report updates members and corporate sponsors on SCAN's programs, initiatives, current volunteers, budget, and more. To access the publication on SCAN's Web site, go to www.scandpg.org/about-us/annual-reports.

■ News from Wellness/CV RDs Subunit

Check out these exciting offerings from the Wellness/CV RDs:

• **Webinars.** Capturing tremendous response for the first three Wellness/CV webinars launched in 2010 (with nearly 1,000 RDs viewing just one of these presentations), SCAN will continue this popular series in 2011. Watch for details on new webinars sponsored by Canola Oil in February, POM Wonderful in March, and others. Go to www.scandpg.org/event-calendar and scroll down the page.

• **Corporate Wellness PowerPoint and Handouts.** This flexible, powerful tool—*Take Control of Your Health: Tips for Eating Healthy and Being Fit for a Lifetime*—features 52 slides with notes and handouts (purchased separately), including a sample contract to use for services. The presentation provides facts on good nutrition, fitness for life, and how employees' poor diets on can weaken a company's bottom line. Better yet, it can be adapted for any type of nutrition and fitness presentation because the slides can easily be moved and adjusted. You can easily replace the sample RD picture at the end with your own. To purchase, go to www.scandpg.org, click on Online Store, and then Wellness/CV.

■ News from Sports Dietetics USA (SD-USA)

Here are some highlights from the SD-USA subunit:

• **2011 CSSD Exam Windows.** Note the 2011 windows for the Board Certified Specialist in Sports Dietetics (CSSD) exam: **February 7-28** (except February 15) – application deadline has passed; **July 11-29 —** application postmark deadline April 25, 2011. For eligibility information and an application, go to www.cdrnet.org.

• **Register Now for Sports Nutrition Workshop.** A pre-SCAN Symposium Sports Nutrition Workshop, *The Cascade of Concussion: Minimizing Risks, Reducing Serious Consequences, Stimulating Recovery*, is slated for March 11, 201l, 7:30 to 11:30 am, in Chicago, IL. To register, visit www.scandpg.org.

• **SCAN's Video: *Sports Nutrition – Who Delivers?*** Leave a lasting impression! Show your audiences this professionally produced video in which athletes tout the value of sports dietitians. View it at www.scandpg.org and on YouTube.

• **Sports Nutrition Fact Sheets.** Use these colorful sheets to educate clients, enhance your practice, and promote your expertise. You can even have them customized with your *personalized* business information and message. Check them out at www.scandpg.org/sports-nutrition/sports-nutrition-fact-sheets.

• ***SD-USA Score.*** The SD-USA e-newsletter is delivered to your inbox in a new format six times a year. Contact Amy Goodson, MS, RD, CSSD, at amygoodson@alumni.tcu.edu with your ideas for topics.

• **ADA's Nutrition Care Manual® (NCM).** The 2010 ADA Nutrition Care Manual® (NCM) contains a "Sports Nutrition and Performance" section written and updated by SD-USA members. New to the 2010 edition is organization of the NCM using the Nutrition Care Process. Subscribe to the NCM at http://nutritioncaremanual.org.

• **Help customers find you!** List yourself on "**Find a SCAN Dietitian**" on www.scandpg.org to increase your reach to the public and potential employers.

• **Join SD-USA**. Sign up for SD-USA, a free SCAN member benefit, via the Member Profile on www.scandpg.org. Check the box for Sports Dietetics-USA at the bottom of the Member Profile.

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Upcoming Events

March 3-6, 2011
International Association of Eating Disorder Professionals (IAEDP) Symposium, Phoenix, AZ. For information: www.iaedp.com

March 11-13, 2011
Join your colleagues at the **27th Annual SCAN Symposium,** *Optimizing Performance, Wellness, and Health Through Nutrition.* Chicago, IL. For information: www.scandpg.org

April 9-13, 2011
Experimental Biology (EB) Annual Meeting, Washington, DC. For information: http://experimentalbiology.org

April 13-16, 2011
15th Annual Health & Fitness Summit, Anaheim, CA. For information: American College of Sports Medicine, www.acsm.org

May 31-June 4, 2011
American College of Sports Medicine Annual Meeting, Denver, CO. For information: www.acsm.org

July 11-29, 2011
CDR Sports Dietetic Specialty Examination (at various U.S. sites). Postmark deadline for applications is **April 25, 2011.** For information: Commission on Dietetics Registration: www.cdrnet.org

SCAN'S PULSE

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Appropriate announcements are welcome. Deadline for the Summer 2011 issue: **March 1, 2010.** Deadline for the Fall 2011 issue: **June 1, 2011.**

Manuscripts (original research, review articles, etc.) will be considered for publication. Guidelines for authors are available at www.scandpg.org. E-mail manuscript to the Editor-in-Chief; allow up to 6 weeks for a response.

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