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CONTENTS

Ginger: A Spice That May Reign in Pain

by Christopher D. Black, PhD, and Patrick J. O'Connor, PhD

Increasingly, natural products such as echinacea, ginseng, and ginkgo biloba are being used to treat medically-related health problems.[1] Based on a survey of 31,044 adults in the United States, approximately 38 million are estimated to use natural products as an alternative therapy for a medical problem, and ginger is among the 10 most popular of these products.[1] Widely used as a culinary spice, ginger *(Zingiber officinale)* is frequently added to foods and drinks such as ginger snaps, ginger ale, and ginger tea. It also has been used in traditional Indian and Chinese medicine as a treatment for various ailments including asthma, diabetes, nausea, and stroke as well as pain conditions such as rheumatism and toothache.[2,3] More recently, focus has turned to the potential of ginger to reduce exercise-induced muscle pain. This review describes the use of ginger as a natural remedy and a potential analgesic agent for delayed onset muscle soreness (DOMS).

Anti-nausea Effects of Ginger

Ginger has long been recommended as a treatment for nausea and vomiting during pregnancy, and it has been experimentally shown to reduce nausea related to motion-sickness.[4] Recently, a large randomized trial provided evidence that ginger may reduce the adverse effects associated with chemotherapy. Research presented at the 2009 American Society of Clinical Oncology Annual Meeting indicated that patients with breast cancer (n=644) who combined 0.5 g and 1.0 g of ginger with a standard anti-vomiting drug reported an approximate 40% reduction in nausea severity compared with those who took a placebo.[5] The participants took three capsules twice daily for 3 days before and 3 days after their chemotherapy treatment.[5]

Ginger and Pain Treatment

Ginger also has undergone evaluation as a treatment for osteoarthritis pain. Data from several randomized controlled trials involving patients with osteoarthritis have demonstrated that daily ginger supplementation in dosages of 30 mg to 500 mg per day for 4 to 36 weeks reduces pain associated with movement of the hips and knees to a greater extent than placebo.[6-8]

One possible explanation for ginger's

potential pain-relieving properties is that it functions in a similar manner to nonsteroidal anti-inflammatory drugs (NSAIDs), such as aspirin and ibuprofen. Evidence from *in vitro* studies have shown that several of the constituents of ginger (gingerols, shogaols, paradols, and zingerone—compounds that give ginger its unique smell and taste) inhibit the actions of the cyclooxygenase enzymes 1 and 2 (COX-1 and COX-2).[9-11] Ginger also reduces the production of pro-inflammatory cytokines such as interleukin (IL)-1, IL-12, and tumor necrosis factor (TNF)-α[12-13] These enzymes and cytokines play a key role in the inflammatory response that often leads to pain and swelling in muscles and joints.

In addition to these anti-inflammatory actions, ginger agonizes the transient receptor potential vanilloid receptor (TRPV1),[14] commonly called the capsaicin receptor. Capsaicin is the substance found in red peppers that give this vegetable its characteristic heat or burning sensation when eaten. The TRPV1 receptor is known to play a role in the central and peripheral processing of noxious stimuli.[15,16] Topical creams containing capsaicin have been used for pain relief in individuals with peripheral neuropathies and other pain conditions. Anti-arthritis and anti-pain creams containing ginger and ginger extracts are also available, although data regarding their efficacy is lacking.

The Role of Ginger in DOMS

In a series of studies reported at the 2009 American College of Sports Medicine Annual Meeting and described in a forthcoming article,[17] the effects of ginger consumption on muscle pain and soreness following high-intensity eccentric exercise were examined. Using a double-blind, placebo-controlled crossover design, we examined the effects of 2 g of ginger on muscle soreness and function ingested 24 hours and 48 hours following high-intensity eccentric weightlifting (3 sets of 8 repetitions with a weight equal to 120% of concentric 1-RM). The results indicated that ginger did not reduce soreness or lead to improved function during the 60 minutes following consumption. However, ginger was found to exert a more delayed effect on the day-to-day progression of soreness. Among the participants who consumed ginger on the first day following eccentric exercise, soreness had decreased 13% at the time they reported to the laboratory 24 hours later. In contrast, the participants who received placebo on the first day experienced no reduction in soreness on the second testing day.

This delayed analgesic effect of ginger, along with the findings that longer-term supplementation reduced pain in patients with osteoarthritis, prompted additional investigations of the effects of multiple days of ginger consumption on exercise-induced muscle pain and soreness. In two subsequent studies, we examined the effects of daily consumption of 2 g of ginger for 7 days before and 3 days after high-intensity eccentric weightlifting (3 sets of 6 repetitions with a weight equal to 120% of concentric 1-RM) on muscle soreness and function.[17] In the first study, "raw" or untreated ginger was administered; in the second study, ginger was "heat-treated" prior to being ground into a powder. Heat treating ginger potentially mimics cooking and has been suggested to

> "...soreness had decreased 13% at the time they reported to the laboratory 24 hours later."

From The Editor

What You Don't Know CAN Hurt You

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

We're all familiar with the line, "What you don't know can't hurt you," but I'm guessing most of us don't really believe that. In the world of nutrition, what you don't know actually might limit your capacity to effectively practice dietetics. This issue of *PULSE* is loaded with information that many of us aren't particularly familiar with, so a close read of the articles and other contributions just might help you and your clients.

Speaking of being hurt, our cover article might give you some ideas for reducing your client's pains. In that article, Christopher Black, PhD, and Patrick O'Connor, PhD, describe research suggesting that the common spice ginger may help to reduce symptoms of delayed onset muscle soreness. This issue's free continuing professional education (CPE) article, by Fariba Roughead, PhD, RD, sheds light on critical issues regarding interpretation of research on "acid-producing" foods/nutrients. Can they really hurt your bones as some have suggested? In another article, Kelly Allison, PhD, Sarah Horsey, and Diana Chirinos Medina will teach you a few new things about night eating syndrome and treatment strategies that you might consider for clients suffering from this form of disordered eating. We think you'll find the summary prepared by Julie Culp, MS, Bhavna Sharma, PhD, Satya Jonnalagadda, PhD, RD, and Jessica Campbell, PhD, which capsulizes the cardiovascular-related implications of vitamin D and calcium revealed by a recent evidence review, to be a painless way to learn what type of evidence will be considered when research for potential new dietary reference intakes (DRIs) for these nutrients is being examined. Lastly, Elizabeth Llewellyn illustrates how professionals and community members in Tennessee developed an eating disorder coalition and provides tips on how similar groups can be formed elsewhere.

It also can't hurt to keep up with everything else that is going on with *PULSE,* SCAN, and our members through our usual departments, so be sure to check out everything. I hope you'll find every page informative—after all, I don't think I've ever heard anyone say, "What you DO know can hurt you."

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increase its pain-relieving properties.[18] Results showed that participants who underwent 11 days of supplementation (7 days prior, the day of, and 3 days following eccentric exercise) experienced 25% (raw group) and 23% (heat-treated group) less muscle pain and soreness compared with those who consumed a placebo. Although we did not directly compare ginger with NSAIDs, the amount of pain relief conferred by ginger in our studies suggests that ginger is at least as efficacious and in some cases better than NSAIDS in treating muscle soreness.

Safety Considerations

One of the primary adverse effects of long-term treatment of pain with NSAIDS such as aspirin and ibuprofen is the development of gastric ulcers. Across our studies, the most common adverse effect from ginger consumption was heartburn. Ginger has been purported to be a safer option than NSAIDs, and perhaps even to be a treatment for ulcers. However, no data exist to confirm these suppositions. Ginger is a non-specific inhibitor of COX-1 and 2 enzymes, as are aspirin and ibuprofen. Thus, it is possible that long-term use of ginger could inhibit gastric prostaglandin E production and possibly lead to irritation of the gastrointestinal mucosal lining, much like NSAIDs.

Application of Ginger Supplementation in Exercise

Muscle pain and soreness, joint stiffness, and swelling often occur in individuals who are beginning an exercise program or are "weekend warriors" performing repeated, high-intensity exercise only a few times per month. Sedentary individuals and older individuals also are known to be at a greater risk of experiencing pain and soreness. These groups may derive the greatest health benefits from undertaking an exercise program, but muscle pain may serve as a barrier to exercise adherence. Our data suggest that consuming 2 g of ginger daily can reduce the exercise-induced muscle pain common among athletes and amateurs alike.

The 2-g dose used in our studies roughly equates to approximately 1 teaspoon of powered ginger, 1 tablespoon (10 g) of fresh ginger, or 2 mL of ginger extract. This amount or more is commonly used to make ginger tea and to season many types of food. In addition, certain types of ginger ale may contain significant amounts of ginger (e.g., a 12-oz bottle of Reed's Original Ginger Brew contains 17 g of fresh ginger). Powered ginger is readily available at many pharmacies and health food stores in easily consumable 250 mg- to 1,000-mg tablets and capsules. To most effectively mimic the ginger used in our studies, we suggest looking for ginger capsules containing a standardized extract known to have a

gingerol content of 5%. Care should be taken when purchasing ginger supplements to ensure their content and safety, because dietary supplements are regulated differently than tradition foods and drugs by the Food and Drug Administration.

In summary, although future research is needed to elucidate the minimal effective dose and whether a small amount of ginger consumed daily in drinks or foods can reduce muscle pain, there is compelling evidence that ginger is indeed an effective alternative to NSAIDs for the treatment of muscle pain and soreness.

"Care should be taken when purchasing ginger supplements to ensure their content and safety."

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CPE article

The Perils of Reductionism in Nutrition Science: The Case of the Acid-Ash Hypothesis

by Zamzam (Fariba) K. Roughead, PhD, RD

*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: 216/531-5063; or email: scandpg@gmail.com.*

Learning Objectives

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

- Recognize the pitfalls of accepting a reductionist approach for understanding a complex issue.
- Describe evidence contradicting the acid-ash hypothesis.
- Explain the effects of dietary protein on calcium balance.

In investigating the complex role of nutrition in health and disease, nutrition scientists have conventionally applied reductionism in an effort to understand the relationships for translation into public advice. Reductionism can be described, in part, as an approach to understand the nature of complex things by reducing them to the interactions of their parts, or to simpler or more fundamental things. However, the hazard of such an approach is oversimplification of the problem, leading to misinterpretations. The study of the role of dietary protein in the etiology of osteoporosis is an example of this type of oversimplification.

Osteoporosis is a major public health threat characterized by low bone mass and fragility leading to increased risk of fractures. Osteoporosis affects an estimated 44 million Americans, which includes 55% of those aged 50 years and older.[1] To combat this debilitating disease, the public is advised to limit their protein, caffeine, phosphorus, and sodium intake based on the hypothesis that these factors adversely affect calcium metabolism.[2] However, the basis of this advice, especially for protein and phosphorus, is controversial and the subject of much debate. Epidemiologic studies examining the effects of protein on bone health have not been helpful in resolving the controversy and have also yielded mixed results.[3-7]

The Acid-Ash Hypothesis

The notion that dietary protein increases calcium loss began in the early 20th century[8,9] and was later formulated into a hypothesis.[10] The underlying mechanism for this hypothesis is based on the role of bone as a buffering reservoir that aids the kidneys and lungs in the tight regulation of the systemic hydrogen ion concentration. Dietary practices that lead to chronic production of acid ash, such as diets high in protein and phosphates, are hypothesized to tap into this alkali reservoir and cause a gradual dissolution of bone mineral[10]and as such are considered a risk for hypercalciuria and osteoporosis.[7,11,12]

The increased endogenous acid production is thought to also increase glomerular filtration rate and thus decrease renal reabsorption of calcium, leading to increased urinary calcium and bone loss. Remer and Manz[13] have developed a calculation to predict the potential renal acid. According to this calculation, anions (e.g., phosphate, sulfate, and chloride) are classified as "acidic" ions, and cations (namely sodium, potassium, calcium, and magnesium) are classified as "alkaline."[14] Based on the calculation, meat, fish, dairy, and grains are considered detrimental to bone health because of their high sulfate and phosphate content, whereas high potassium-containing foods such as fruits and vegetables are thought to be protective to bone health.

Recent evidence from intervention studies investigating the role of dietary protein and phosphate do not support the acid-ash hypothesis; this evidence is discussed in more detail later in this article. Paradoxically, the formula proposed by Remer and Manz assigns sodium a protective role for calcium balance; however, sodium has been shown to compete with calcium for renal reabsorption and thus may impair calcium retention. Both salt-loading studies and reports of free-living populations have found that urinary calcium excretion increases approximately 1mmol (40 mg) for each 100 mmol (2,300 mg) increase in dietary sodium in normal adults.[15]

Dietary Protein

Consistent with the acid-ash hypothesis, the hypercalciuric effect of sulfates has been demonstrated in studies using both purified[15-19] and common sources of protein when phosphorus intakes were held constant.[20] However, when increased protein is added as common foods, without manipulation of the phosphorus content, hypercalciuria is not observed.[21-24] Although the sulfur amino acids are thought to cause hypercalciuria, the high phosphorus content of these proteins has been found to negate this effect.[21] Many staple plant proteins, such as wheat

and rice, have sulfur amino acid contents that are similar to or higher than meats,[25] but the coexisting alkalis are thought to reduce the dietary acid load.[26]

Furthermore, the increased ammoniagenesis observed with higher protein intake may partly neutralize the acid production.[27] In addition, high protein intake (~20% of energy) may increase intestinal calcium absorption.[28] Thus, the net effect of a protein source on calcium balance is determined by many coexisting factors in both the protein source and in the whole diet, thereby making it difficult to predict.

> "…increased protein intake does not adversely affect whole body calcium retention or any indices of bone metabolism."[24,29,30]

Benefits of Dietary Protein on Calcium Metabolism

According to the results of recent studies that had sufficient statistical power and used radiotracer and sensitive whole body counting methodology to investigate carefully controlled diets of several weeks duration, increased protein intake does not adversely affect whole body calcium retention or any indices of bone metabolism.[24,29,30] Also, moderately high protein intake (~20% of energy) reduced markers of bone resorption (urinary deoxypyridinoline) and increased serum insulin-like growth factor 1 (IGF-1) concentrations without affecting parathyroid hormone. It was concluded that under practical dietary conditions, increased dietary protein was not detrimental to calcium balance or bone health.[24,31] In fact, rather than an antagonistic effect, the findings also indicated a synergistic interaction between dietary protein and calcium such that a high protein intake increased calcium absorption when calcium intake was low (~600 mg/d).

This beneficial effect of high protein intake may be due in part to the higher phosphate intake accompanying the higher protein intake. This notion is strongly supported by a recent meta-analysis of 12 studies in which Fenton and colleagues quantified the contribution of phosphate intake to bone loss in healthy adults (n=269).[32] The data indicated that urinary calcium loss decreases in response to phosphate intake, independent of calcium intake or form of phosphorus.

While research on the effects of dietary protein on bone health has been primarily focused on the acid-base equilibrium and the effect on urinary calcium loss, recent evidence does not support this connection. In a recent meta-analysis, Fenton and colleagues found that despite a significant linear relationship between an increase in net acid excretion (NAE) and urinary calcium, no relationship exists between changes in NAE and markers of bone breakdown (e.g., urinary N-telopeptides).[33] They concluded that evidence from high-quality studies support neither the concept that the calciuria associated with higher NAE reflects a net loss of whole body calcium nor the notion that increasing the diet acid load promotes skeletal bone mineral loss or osteoporosis. The accumulated evidence indicates that the effects of changes in urinary calcium may have been overemphasized in determination of the effect of dietary protein on body calcium balance and, therefore, on bone health.

There is ample evidence indicating that increased dietary protein has favorable systemic effects beyond its effect on calcium excretion. Experimental and clinical studies suggest that protein intake affects both the production and action of growth factors such as IGF-1. It is well-established that a decreased serum concentration of IGF-1 is strongly associated with decreased bone strength in animals[34] and an increase in risk of osteoporotic fractures in humans.[35] Both the hepatic production and the total level of IGF-1 are under the influence of dietary proteins, and protein restriction has been shown to reduce plasma IGF-1 in humans,[36] inducing a resistance of target organs to the action of growth hormone.[37] In a controlled, 1-year intervention study, 20 g of supplemental dietary protein per day improved hip bone mineral density (and serum IGF-1) in elderly patients with recent hip fracture.[38] The systemic effects of changes in dietary protein source and quantity are the subject of recent debate in the literature.[39-42]

Recent evidence from controlled feeding studies and two pivotal meta-analyses is contrary to the acid-ash hypothesis and challenge its validity in the general public consuming a varied diet. Furthermore, evidence on the benefits of alkaline diets on bone health also indicates that the hypothesis needs further assessment. For example, results from a 2-year randomized, controlled trial—the longest alkali supplementation trial to date—revealed that potassium citrate supplementation did not affect bone turnover or bone mineral density, indicating that any benefit of fruit and vegetable intake cannot be explained by the potassium intake.[43]

Conclusion

Despite a lack of supportive evidence, the acid-ash hypothesis is heavily promoted through public media in the form of benefits of "alkaline" diets, especially for bone health. A close examination of the evolution of our understanding of the acid-ash hypothesis and the role of protein in bone health points to the following:

The conventional scientific reductionism in which the effect of dietary protein has been simplified to its sulfur amino acid content (not accounting for the accompanying phosphorus) and in which urinary calcium has been used as surrogate indicator of bone calcium loss (ignoring variations in calcium absorption and systemic effects of dietary protein) has led to public advice negated by a robust body of evidence.

Because we consume complex foods and not isolated nutrients, and because the human body is a system of organs with complex interrelationships and dynamic adaptive capacity, the study of the effect of whole foods on health and disease demands complex design and the scientific will to tolerate multiple variables. Dietetics professionals are uniquely poised to identify scientific questions of public health relevance, help formulate hypotheses intended to test the effects of whole foods on whole systems, and generate relevant, substantiated public health advice.

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Night Eating Syndrome: Overview and Treatment

by Kelly C. Allison, PhD, Sarah Horsey, and Diana A. Chirinos Medina

Night eating syndrome (NES) was first described in 1955 by Stunkard and colleagues as a disorder characterized by morning anorexia, evening hyperphagia, and insomnia.[1] NES received increasing attention starting in the 1990s, and a recent literature search showed that approximately 100 papers on NES were published during the 10 years preceding October 2009. Since the syndrome was first described, several definitions have been used in research endeavors, making it difficult to generalize across studies and provide a unified classification of NES. [2]

The prevalence of NES has been reported at 1.5%, 1.6%, and 5.7% in general population studies.[3] In special populations, prevalence ranges from 6% to 16% among weight loss samples of class I and II obesity, 9% among bariatric surgery candidates, 3.8% among older adults in a study of type 2 diabetes, and 12% among patients of university-based outpatient psychiatric clinics.[3]

Proposed Diagnostic Criteria

In 2008, expert investigators assembled at the First International Night Eating Symposium in Minneapolis, MN, to reach consensus on a set of provisional diagnostic criteria for NES.[4] The group proposed two core criteria for NES, both of which demonstrate a delayed pattern of eating, as follows:[4]

Criterion A1: *Evening hyperphagia,* defined as the consumption of at least 25% of daily caloric intake after the evening meal, and/or

Criterion A2: *Nocturnal ingestions* (i.e., awakening to eat) that occur at least two times per week

Other proposed criteria for NES include:[4]
Criterion B: Awareness and recall of these nocturnal ingestions

Criterion C: At least three of the following features):

- morning anorexia
- strong urge to eat between dinner and sleep onset and/or during the night
- sleep onset insomnia and maintenance insomnia (sleep onset insomnia is delay in falling asleep, usually >30 minutes; sleep maintenance insomnia is trouble staying asleep during the sleep period.)
- belief that one must eat in order to initiate or return to sleep
- depressed mood or worsening of mood in the evening

Criterion D. Distress or impairment in functioning

Criterion E. Presence of night eating for at least 3 months

Criterion F. The disorder is not secondary to different medical or psychiatric conditions

Differential Criteria

Overlap between NES and other eating disorders as well as sleep-related eating disorder (SRED) has been described. Binge eating disorder (BED) and bulimia nervosa (BN) are the two eating disorders most likely to be confused with NES, because many binge episodes occur in the evening. Important differences in the core criteria are as follows: 1) the average caloric intake consumed during the night is not objectively large in NES; it is more similar to the size of regular snacks at about 300 kcal to 400 kcal; and 2) the circadian delay of eating that is characteristic of NES has not been well-documented in BED or BN.

The new diagnostic criteria for NES specifically require awareness of nocturnal ingestions to differentiate it from SRED, a condition characterized by sleepwalking and eating. In SRED, odd or non-food items such as shaving cream from a razor are often ingested. This sleepwalking behavior can obviously be dangerous. Moreover, psychotherapy cannot be utilized for treatment, and pharmacotherapy options that are typically effective for NES, such as serotonin reuptake inhibitors (SSRIs), are not efficacious in treating SRED. Thus, although some patients present with symptoms of both NES and SRED, the majority do not experience both types of night eating, and most researchers believe they are two separate syndromes that perhaps fall on a continuum of night eating behaviors.[5]

Case Study

Mr. Smith is a 61-year-old Caucasian male with a height of 5'8", weight of 235 lbs, and body mass index (BMI) of 36 kg/m^2. He is a Vietnam veteran and is currently being treated for several other psychiatric comorbidities. He lives with his wife of 40 years, and spends his time shopping and doing household chores. His wife keeps a regular eating and sleeping schedule. Mr. Smith reports early morning awakenings at about 3:00 am related to his depression, and gets out of bed around 7:00 am. He reports being moderately hungry in the morning, but does not eat until 4:00 pm. He remarks that he is hungry but does not feel like eating. If he does have breakfast, it consists of 16 oz of caffeinated coffee. His dinner typically consists of normal to large portions of meat, vegetables, and starch. A few hours later, he has a snack in front of the TV, typically chips and soda. He generally has a second snack, such as cookies, before retiring to bed at 10:00 pm, but reports not going back and forth to the kitchen between snacks.

He reports that he has an adequate sleep environment (e.g., dark, no TV) and sleeps separately from his wife because he uses a continuous positive air pressure (CPAP) machine to treat his sleep apnea. He notes that it takes anywhere from 10 minutes to 2 hours to fall asleep initially. After approximately an hour, he wakes up "ravenous" and goes to the kitchen to eat. The types of foods he consumes include hot dogs, dinner leftovers, ice cream, and waffles. If necessary, he uses the microwave or toaster to heat foods. After 15 to 30 minutes, he returns to bed and falls asleep quickly.

Mr. Smith has been engaging in night eating for the past 10 years. He wakes to eat approximately three or four times per night. He reports that there are no foods he eats at night that he avoids during the day. He says he is fully aware of his eating during the night, but has no control over it. Currently, there is no difference in his night eating from weekdays to weekends, and he will bring food with him when traveling to assure that he has enough snacks to eat during the night no matter where he is sleeping.

> " . . . several definitions have been used in research endeavors, making it difficult to generalize across studies and provide a unified classification of NES. "[2]

Case Discussion

Mr. Smith shows the core aspect of a delayed circadian pattern of eating. He drinks only coffee until the afternoon, eats a large dinner, and then experiences several nocturnal ingestions during the night. He has several psychiatric and medical comorbidities, such as depression and sleep apnea. Studies have shown that sleep apnea is not significantly associated with NES, so in this case it is likely coincident to his NES. Even with treat-

ment involving CPAP, he wakes during the night and seeks food. Depressed mood is more commonly related to NES and is listed as one of the options under Criterion C of the diagnostic criteria. Treatment for this patient would start with restructuring his daytime eating and providing him with strategies to limit his nocturnal ingestions.

Treatment for Night Eating Syndrome

The literature is limited in reporting NES treatment trials. Three reports suggested that SSRIs were efficacious on an open-label basis. One randomized controlled trial confirmed the effectiveness of sertraline over placebo in reducing the core behaviors of NES, including significant reductions in percentage of daily food intake after dinner and the number of nocturnal ingestions.[2,3] Open-label reports on the use of topiramate also have revealed promising results.[5]

Allison and colleagues have developed a 12-week cognitive behavior therapy program for NES, based partly on treatments for behavioral weight loss and binge eating while addressing specific features of NES.[6] Therapy involves meeting with the patient weekly for the first 8 weeks and then biweekly for sessions 9 and 10. The treatment goals include shifting the patient's circadian pattern of food intake from the evening and nighttime to earlier in the day, and concurrently removing the habituated response of eating to initiate sleep and/or to fall back asleep during the night.

In the first four sessions, treatment is focused largely on behavioral techniques and modifications. Patients are expected to keep careful food and sleep logs that continue throughout treatment. These logs can be used by the clinician to determine the patient's average baseline proportion of calories consumed after the evening meal and then serve to monitor the patient's progress and difficulties as treatment continues. Patients are also asked to complete assessments of hunger, cravings, and emotions before engaging in night eating, using the Nighttime Eating Assessment (NEA).[7] Depending on the time of day the patient consumes his/her first meal, goals are established to begin eating earlier in the day (e.g., if lunch is the first meal consumed, a mid-morning snack will be encouraged), until the patient is consuming three regular meals and two to three snacks during the day.

> "It is as prevalent as or more prevalent than bulimia nervosa, binge eating disorder, and anorexia nervosa."

For patients who are overweight or obese, behavioral weight loss is included in the treatment plan. These patients are generally most distressed about their NES due to its influence on their weight. Patients can successfully follow structured eating within typical behavioral weight-loss calorie ranges (e.g., 1,200-1,500 kcal/d for women and 1,500- 1,800 kcal/d for men) as a part of the treatment plan.[6]

Behavior techniques—such as closing the bedroom door, locking pantry doors at night, and placing meaningful signs on the bedroom door, in the bathroom, and in the kitchen instructing the patient to go back to bed and resist eating—are often employed to help reduce nighttime eating. Patients complete a behavioral chain in session to draw attention to each step in the process of seeking and consuming food at night and to determine "weakest links" that can be targeted in an effort to break the cycle.[8] Records of dysfunctional thoughts are another tool implemented in an effort to help patients challenge thoughts, feelings, and behaviors associated with nighttime eating. Thought records are also useful in identifying responses to daytime events that create anxiety or depressed mood and influence eating and sleep behaviors. For patients who have a weight loss goal, caloric restriction is introduced in the third session, after a regular pattern of daytime eating has been established.[7,8]

Sessions 5 through 8 continue to focus on the interplay of cognitions, emotions, and behaviors while also addressing good sleep hygiene, stress reduction exercises (e.g., deep breathing and progressive muscle relaxation), and the importance of daily physical activity. The final two sessions focus on increasing the patient's self-efficacy and examining his/her progress in reducing night eating behaviors. In addition, the clinician and patient anticipate potential stressors or cues for night eating in the future and perform problem solving to prevent relapse. Further sessions can be continued as needed, and booster sessions can be held to prevent relapse.

Summary

Night eating syndrome is a delayed circadian pattern of eating that is disruptive to sleeping patterns, shameful and embarrassing, and often leads to weight gain. It is as prevalent as or more prevalent than bulimia nervosa, binge eating disorder, and anorexia nervosa. Treatment studies are still relatively few, but SSRIs and cognitive behavior therapy have shown some promising results.

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Impact of Vitamin D and Calcium on Health Outcomes: Reviewing the Evidence

by Satya S. Jonnalagadda, PhD, RD; Julie Culp, MS; Bhavna Sharma, PhD; and Jessica Campbell, PhD

In 2008, the Institute of Medicine (IOM) established the Committee to Review Dietary Reference Intakes (DRIs) for Vitamin D and Calcium, charging the group with the task of assessing current relevant data and updating the DRIs for vitamin D and calcium, as appropriate. Consequently, the Agency for Healthcare Research and Quality (AHRQ)—the research arm of the U.S. Department of Health and Human Services—was commissioned to systematically review the evidence on the impact of vitamin D, calcium, and both nutrients combined on various health outcomes. This article describes key issues reviewed in the AHRQ's evidence report.

The Systematic Review: Examining Several Outcomes

AHRQ, which collaborates with the public and private sectors to build the knowledge base for what works (and does not work) in health and then translate that knowledge into practice and policymaking, contracted with the Tufts Evidence-based Practice Center[1] to conduct the systematic evidence review. The review looked at data on the relationship of vitamin D and calcium to several health outcomes: growth, pregnancy-related outcomes, bone health, cardiovascular disease, hypertension and blood pressure, cancer, and all-cause mortality.

Included in the review were primary interventional or observational studies, as well as other systematic reviews meeting inclusion and exclusion criteria; excluded were cross-sectional and retrospective case-control studies. Stringent inclusion criteria were applied to determine which studies to evaluate, resulting in a review of only the best conducted trials. In total, the investigators summarized data from 165 primary articles and 11 systematic reviews. Results from the AHRQ review will serve as the foundation for efforts of the Committee to Review DRIs for Vitamin D and Calcium.

Overall Conclusions

The overall conclusions of this evidence review on vitamin D, calcium, and health outcomes are as follows:[1] It is difficult to draw firm conclusions on the basis of available literature.

- For growth rates in children or adolescents, calcium supplementation has no significant effect on weight or height gain.
- For body weight, trials were consistent in finding no significant effect of increased calcium intake on weight loss.
- For blood pressure, calcium supplementation lowered systolic blood pressure by 2 mm Hg to 4 mm Hg.
- Findings were inconsistent across studies for colorectal and prostate cancer and pregnancy-related outcomes.
- For breast cancer, higher calcium intakes were associated with decreased risk in premenopausal women.
- For bone health, vitamin D plus calcium supplementation resulted in small increases in bone mineral density of the spine in older women.

In general, the current available studies were not designed to address DRIs. There is large variation in the methodological quality of studies, and based on the current evidence it is not feasible to determine a dose-response relationship between health outcomes and intake of vitamin D alone, calcium alone, or calcium plus vitamin D.[1]

Vitamin D and Calcium in Cardiovascular Disease

The evidence review examined data from primary studies that evaluated the associations between vitamin D and/or calcium status and cardiovascular disease (CVD) outcomes.

Cohort studies found significant negative associations between serum 25(OH) D concentrations and total CVD events. Individuals in the Framingham Offspring Study who had serum 25(OH) D concentrations less than 37.5 nmol/L were 70% more likely to have a cardiovascular event.[2] However, based on the overall evidence, no significant associations were found between serum 25(OH) D concentrations and cardiovascular death, ischemic heart disease, myocardial infarction, or stroke when the events were evaluated separately.

Likewise, no significant association was observed between calcium intake and cardiovascular death, cardiac events (fatal and nonfatal), cardiac deaths, nonfatal myocardial infarction, or stroke. The data also revealed no significant effect on any cardiovascular outcome with combined vitamin D and calcium intake.

Overall, the main conclusions from the AHRQ evidence review suggest that a significant negative association has been observed between low 25(OH) vitamin D concentrations and risk of cardiovascular events among individuals aged 51 to 70 years. Consistent support of a benefit of vitamin D and/or calcium on CVD outcomes in the overall population is not available, and no significant association was observed between calcium intake and CVD outcomes. There are few well-designed epidemiologic studies and randomized clinical trials (RCTs) for vitamin D and/or calcium and CVD outcomes. More studies are needed to fully elucidate the impact of these nutrients on CVD risk reduction and their mechanisms of action.

Effects of Vitamin D and Calcium on Body Weight

In addressing another health outcome, the evidence review looked at primary studies that investigated associations between vitamin D and/or calcium and body weight.

In terms of vitamin D and body weight regulation, no cohort studies have evaluated the relationship between serum 25(OH) D concentrations and body weight, while three poor-quality RCTs examining different populations found no difference in weight change with or without vitamin D supplementation.[3-5]

> "Consistent support of a benefit of vitamin D and/or calcium on CVD outcomes in the overall population is not available."

Regarding the relationship between calcium and body weight, the investigators found no primary studies that examined the associations between calcium intake or body stores and incidence of overweight or obesity. Studies evaluating the effect of calcium (or dairy) supplementation on body weight reported no significant effect of calcium supplementation on body weight, despite energy-restricted diets. There is limited evidence examining the combined effects of vitamin D and calcium on body weight. Limited evidence is available to support the role of vitamin D and/or calcium intake, including supplementation, on body weight regulation.

Investigators of the review concluded that consistent support of a benefit of vitamin D and/or calcium on body weight is not available, and RCTs are needed to elucidate their impact on body weight. Overall the literature contains few RCTs for vitamin D and calcium and/or both and body weight. The majority of the studies examining the effect of vitamin D and/or calcium have involved women aged 19 to 50 years. Despite energy restriction, no significant effect on body weight was observed with vitamin D or calcium supplementation.

Impact of Vitamin D and Calcium on Hypertension and Blood Pressure

The review also summarized findings from primary studies that evaluated the association between vitamin D and/or calcium status and hypertension and blood pressure.

The Health Professionals Follow-up Study and Nurses' Health Study found a higher incidence of hypertension among older men and women with baseline serum 25(OH) D concentrations less than 37.5 nmol/L.[6] Men and women with serum 25(OH) D concentrations less than 37.5 nmol/L were more likely to have new onset hypertension compared with those who had concentrations of more than 75 nmol/L.[6] No significant effect of vitamin D supplementation on systolic and diastolic blood pressure was observed.

Calcium data indicate that longitudinal studies do not provide any evidence of an association between calcium intake and risk of hypertension. Furthermore, existing evidence—albeit limited—suggests no significant effect of combined vitamin D and calcium on hypertension or blood pressure.

As revealed by the AHRQ evidence review, there are few well-designed epidemiologic studies and RCTs investigating the impact of vitamin D and/or calcium on hypertension and blood pressure. Although the association between vitamin D and/or

calcium and hypertension and blood pressure has been hypothesized for some time, there is limited supporting evidence. Epidemiologic studies and RCTs are needed to fully elucidate the impact of these nutrients on blood pressure regulation.

Satya Jonnalagadda, PhD, RD, Julie Culp, MS, Bhavna Sharma, PhD, and Jessica Campbell, PhD, are scientists at the General Mills Bell Institute of Health and Nutrition, in Minneapolis, MN.

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Developing an Effective Statewide Eating Disorder Coalition

by Elizabeth Llewellyn

Eating disorders such as anorexia nervosa and bulimia nervosa affect more than 10 million Americans. Millions more suffer from binge eating disorder or are classified with eating disorder not otherwise specified (EDNOS). Although eating disorders are complex mental disorders that have staggering effects, Hoek and Van Hoeken reported in 2003 that only one third of individuals with anorexia and 6% of those with bulimia receive adequate care.[1]

Concerned treatment professionals and community members from across the country have formed local nonprofit organizations to help combat those sobering facts. One such group, the Eating Disorders Coalition of Tennessee (EDCT), began in 1999 as the brainchild of Ovidio Bermudez, MD, and Reba Sloan, RD, LDN, FAED, clinicians in Nashville, TN. What started as a task force operating on seed money from a handful of donors has become a 501(c)(3) organization with an annual budget of more than $175,000. Although it is still considered a small nonprofit organization by national comparison, EDCT has undergone mighty growth in 10 years, in part because of its equal emphasis on three pillars: mission, finances, and leadership.

No Mission, No Money

The fundamental success of any organization begins with a sound mission statement. In *Managing the Non-profit Organization,* management guru Peter F. Drucker gives several guidelines.[2] One guideline applies particularly well to budding nonprofit organizations: "A mission statement has to be operational; otherwise, it's just good intentions." A succinctly crafted, well-deliberated mission will drive everything about an organization, from its fundraising and outreach to its hiring process and daily operations.

The EDCT seeks to fulfill its mission—to offer hope, help, and support to all who are impacted by disordered eating—through a variety of programs, services, and events that are aligned with its mission, including, but not limited to the following:

- The Annual Forum for Professionals is a clinician-only seminar offering American Psychological Association-approved credits. Each year, the Forum attracts about 150 attendees. The Seventh Annual Forum, to be held in Nashville on April 10, 2010, will focus on "Sex, Love and Eating Disorders: The Hunger for Connection," and will feature Anita Johnston, PhD, as the keynote speaker.
- The Speakers Bureau is EDCT's largest program. It provides educational presentations tailored to parents, teachers, students, health care professionals, and community members throughout Tennessee.
- The Youth Education and Support (YES!) Team provides education, resources, and leadership opportunities for students in middle and high schools throughout Tennessee. These students are mentored by community leaders to develop, organize, and implement eating disorders awareness activities and healthy body image campaigns in their schools. The EDCT provides a week-long curriculum to be used in conjunction with Eating Disorders Awareness Week (held the last week of February every year), as well as supplemental materials such as a life-

sized poster exposing the true-to-scale proportions of a Barbie™ doll. To help defray the cost of treatment, the Junior League of Nashville Eating Disorders Resource Library (housed in the EDCT office in Nashville) offers more than 500 books, DVDs, and articles related to eating disorders on 30-day loan.

- The "Find Help Here" section of the EDCT Web site (www.edct.net) features a directory of treatment professionals who treat eating disorders. Clinicians are grouped by city and also have their own personalized listing that describes their practice.
- Families Supporting Families is a free support group created by families, for families. The groups are for parents, siblings, and friends who have a loved one battling an eating disorder.

An effective eating disorder coalition balances its programs and events to appeal to both treatment professionals and community members. This diverse audience also helps to build the second pillar of an effective statewide eating disorder coalition: finances.

No Money, No Mission

Even if there are only two people involved in starting an organization, one must be the treasurer and oversee financial matters. A nonprofit organization's financial health is impacted by many factors, starting with bookkeeping and an itemized budget. Tracking the day-to-day cost of annual operations is critical. Everything from the electric bill to printing costs must be both anticipated and accounted for—whether recorded on paper, on an Excel spreadsheet, or using sophisticated financial management software.

Fundraising can be accomplished by one or a number of individuals, depending on the organization's scope and goals. The most common funding source for new nonprofit organizations is single (i.e., "major") gifts from individuals or businesses who are already familiar with and supportive of the mission or cause. Grants from the government and private/corporate foundations—while a popular choice for established nonprofit organizations—typically require obtaining 501(c)(3) status before applying, thus placing them low on the list of potential funders for new nonprofit entities.

Special events—the pinnacle of nonprofit fundraising—can be the most flexible income opportunity for a nonprofit organization. To maximize a fundraiser's marketing potential, it should align with the organization's mission and vision. EDCT accomplishes this, in part, with two signature events that have evolved significantly over the years:

- Fashion for EveryBODY®, a New York-style fashion show celebrating real-sized "ROLE models," celebrates true beauty regardless of age or size, yet typically attracts a bustling crowd of young professionals. The sixth annual event, held in September 2009, drew about 300 people and raised more than $30,000 from a mixture of sponsorships, ticket sales, and silent auction proceeds.
- The annual Evening of Song & Story, EDCT's more intimate fundraiser featuring the stories of eating disorder survivors as well as a musical guest, typically attracts an older, more established audience. Last year's event netted more than $15,000 and drew about 100 people. By identifying and then targeting a fundraiser's specific audience, an organization can maximize its marketing potential and, most important, diversify and grow its donor base.

Quality Leadership

The third pillar of an effective statewide eating disorder coalition is its people. A successful organization requires a team of like-minded, knowledgeable, and dedicated individuals to craft a strong mission and secure long-lasting financial support. Careful consideration should be given to the state's network of treatment professionals and concerned community members. (In some cases, an organization's readily available resources and manpower may be more effective as a local or area-wide coalition, instead of a statewide group.) Numerous print and online resources, such as BoardSource or a local community foundation, can offer guidelines for recruiting a board of directors (or, if the goal is not to incorporate, an informal advisory board), as well as many other aspects of nonprofit management and development.[3]

The EDCT gained its 501(c)(3) status in 2003 with the help of a core group of about 20 founding members from across the state, all established clinicians. Today the organization has two full-time and one part-time staff members, 20 board of directors members, and an invaluable army of more than 110 volunteers, as well as a referral database of clinical and organizational members from across Tennessee and surrounding states. Clinicians and members of the community alike have an equally strong presence on the EDCT board of directors and program committees.

Maintaining Momentum

Even with a well-crafted mission, sound financial practices, and handpicked leaders, challenges will arise at any stage of the organization's development. Burnout, insufficient funding, and "mission creep" (i.e., the expansion of a mission beyond its original purpose) can present significant roadblocks. With careful planning and regular evaluations, vigilant leaders can lessen and even prevent those problems (as well as others) while celebrating their successes.

Elizabeth Llewellyn is the executive director for Eating Disorders Coalition of Tennessee. More information about the EDCT can be found at www.edct.net.

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From The Chair

Sharpening the Saw—A Metaphor for Renewal

by Gale Welter, MS, RD, CSSD, CSCS

This may be review for some of you. I hope so, but it bears repeating. **"**Sharpen the Saw" is Stephen Covey's seventh habit in his classic tome of personal change, *The 7 Habits of Highly Effective People*. It is a metaphor for ongoing self-renewal. Consider the following adaptation of his analogy:

> *Suppose you came upon someone in the woods working to saw down a tree. He is exhausted from working for hours. You suggest he take a break to sharpen the saw. He might reply, "I don't have time to sharpen the saw—I'm busy sawing!"*

All of us can see the folly in the man's effort, but how many of us are doing essentially the same thing? When we are overworked or overwhelmed our first thought is to take a break, but that isn't sharpening the saw. Many see time away from the saw as frivolous or a threat to success or accomplishment. I submit that sharpening the saw is not a luxury—it is the foundation upon which all other hope for success and accomplishment rests.

While downtime is needed, it isn't the same as sharpening the saw. The woodcutter can become even more productive by sharpening the blade, studying new woodcutting techniques, working out to become stronger, and learning from other woodcutters. He can strengthen core abilities that make daily life easier, fuller, and richer.

Covey suggests that "sharpening the saw" means having a balanced program for self-renewal in four areas of your life:

- Physical—Eating well, exercising, and resting
- Mental—Learning, reading, writing, and teaching
- Social/Emotional—Making meaningful connections with others
- Spiritual—Spending time in nature, expanding one's spiritual self through meditation, music, art, prayer, or giving service to others

As you renew yourself in each of these four areas, you create growth and change in your life. Things you do to sharpen the saw in any one dimension have a positive impact on the other dimensions because they are so highly interrelated, thus increasing your capacity to produce and handle the challenges around you.

These are the very things SCAN members strive to encourage in clients—but does our own conduct reflect reframing the effort into a bare essential rather than a luxury? I encourage all of you to use this metaphor of renewal as a way to revalue time taken to exercise, eat well, stay connected, and seek and savor learning of all types. Use the many benefits of SCAN membership—for example, our various educational and networking opportunities—as renewal resources to help facilitate all that you do.

With my term as SCAN chair soon coming to a close, I cannot help but reflect on all the ways this experience has helped me sharpen my saw. My deepest gratitude goes to all those who worked tirelessly throughout the year to increase and refine SCAN's avenues for skills-sharpening and renewal.

Conference Highlights

ADA Food & Nutrition Conference & Expo (FNCE)

October 17-20, 2009
Denver, CO

The 2009 ADA Food & Nutrition Conference & Expo (FNCE) was abundant with excellent presentations. Presented here are highlights of two sessions that might be of particular interest to SCAN members.

Treatment Techniques for Eating Disordered Patients

In a "how to" session presided by SCAN member Kathy Beals, PhD, RD, eating disorders specialists Carolyn Costin, MA, MEd, CEDS, FAED, and Sondra Kronberg, MS, RD, CDN, presented many excellent counseling tips. The following summarizes some of their suggestions (Note: "She" and "her" are used because eating disorders are most commonly seen in women):

- Healing needs to come from within. Hence, the RD's job is to strengthen the client's healthy self (the soul).
- With a very wasted client, the goal is to calm her down, have her eat small meals to feed the brain, and invite her to talk about what is on her mind.
- To help you better understand your client, ask her to write or talk about her worst eating disorder day. Also ask her to write or talk about what a day in her life would look like when she is recovered.
- Be nurturing yet authoritative and direct—for example, explain to your client, "Exercising three hours a day does this to your body…"
- Don't automatically give a person with an eating disorder a meal plan. If

she has bulimia, she likely won't follow it. If she has anorexia, she will probably become obsessed with it.

■ Each client finds a way of eating that works for her and is the best way for her to take care of herself. It might be counting calories, using food exchanges, or eating intuitively.

■ Teens with eating disorders often think their parents will "win" if the teen gets better. Offer the teen a choice: "If you stay in your comfort zone, you'll stay sick…"

■ Ask your client what the eating disorder means to her. Is it a way to please *herself* (instead of everyone else)?

■ Identify the character traits that led to the client's problems and then transform those traits into becoming part of the solution. That is, perfectionist = tenacious; compulsive = driven; anxious = high energy; "control-freak" = organized.

■ A gap exists between wanting to change and being able to change. The mind wants what is safe, easy, and comfortable, but the client needs to do what is hard, scary, and uncomfortable. Ask the client: "What did you do today that was hard, scary, and adventurous? " The healthy brain needs to convince the eating disordered brain to leave the "safe" area.

■ What a client does with food is a reflection of how she takes care of herself. People with eating disorders can be very self-abusive.

■ People use food to distract them from painful thoughts and feelings. We need to teach them how to identify what triggers the pain and think about what's really going on.

■ When a client feels like bingeing, encourage her to write in her journal before she binges, so she can get in touch with the part of her that wants to binge—as well as the healthy part of her that does not want to do that.

■ Encourage the client to think beyond FAT and translate the feelings: F = fear; A = angry, anxious; T = trust ("What are you not trusting?")

■ Ask the client to identify the fear by completing this statement: "If I eat this ___, I am afraid _____" (e.g., "If I eat this salad with dressing, I am afraid I will get fat.") Then address the question: "What is the truth?" (Salad with dressing will not make you fat.)

■ You might want to ask a client, "Do you want to bring some food or snack into the office to eat with me?" Even eating an apple with you in the office might be a first step towards better intake.

As an RD, you might wonder if you are helping the client. You can tell if your client is making progress if: 1) she keeps coming back; 2) she is eating more "scary" foods; and 3) her life is richer and includes more relationships with people.

Advanced Strategies for Counseling Athletes with Type I Diabetes

In this SCAN-sponsored session chaired by SCAN member Jackie Berning, PhD, RD, CSSD, presenters Michael McDermott, MD, and Roberta Anding, RD, CDE, CSSD, shared details on how to manage athletes with diabetes. While these athletes will be best served by working one-on-one with a certified diabetes educator (CDE) who is well-versed in sports nutrition, the following take-home tips offer some general hints on how to manage this complex topic:

■ Blood glucose (BG) concentrations ranging from 70 mg/dL to 180 mg/dL offer efficient fuel use and enhance optimal performance. Lower or higher levels hurt performance and result in fatigue. Many athletes prefer BG concentrations of 120 mg/dL to 180 mg/dL, for the prevention of hypoglycemia and performance.

■ Athletes should monitor their BG concentrations before they exercise, ideally two or three times, about 30 minutes apart to determine the trend.

■ During exercise, they should measure BG every 30 minutes, if possible.

■ After exercise, they should measure BG at 2 and 4 hours post-exercise if they have a history of post-exercise late-onset hypoglycemia and nighttime hypoglycemia. The risk of exercise-induced hypoglycemia can persist for up to 24 hours after exercise.

■ If BG is less than 65 mg/dL to 100 mg/dL pre-exercise, the athlete should consume 15 g of carbohydrate.

■ If BG is more than 250 mg/dL, the athlete should check for ketones and not exercise if ketones are present. The athlete may need to administer insulin.

■ The athlete needs to consume about 15 g to 30 g of carbohydrate for every 30 to 60 minutes of moderate exercise or about 0.5 g of carbohydrate per pound of body weight for intense exercise.

■ General rules of thumb for adjusting insulin for moderate activity are as follows: 1) do not change background or basal insulin; 2) reduce regular or rapid insulin by 1 to 2 units per 30 minutes of exercise; 3) with pre-mixed insulin, add carbohydrate and do not adjust the dose.

■ If the athlete will perform more than 90 minutes of moderate exercise or 60 minutes of strenuous exercise, the athlete should: 1) consume extra carbohydrates (~75-100 g/h); 2) reduce basal insulin by about 20% to 50%, starting 60 to 90 minutes pre-exercise; and 3) reduce bolus insulin at the meal preceding exercise.

■ Athletes with diabetes should always have readily available fast-acting carbohydrates, e.g., sports drinks (in a known amount), glucose gel, glucose tabs, SweetTarts, Sprees, or Smarties.

■ Some athletes experience unexplained hyperglycemia (high BG without food intake). This is likely a stress response (increased catecholamines) related to anxiety before "the Big Game."

■ Athletes should travel with a "diabetes emergency kit" that includes glucagon, ketone test strips, and rapid-acting carbohydrate choices (glucose tablets).

■ Alcohol suppresses the release of glucose from the liver and can lead to hypoglycemia if no food is consumed along with the alcohol.

Contributed by Nancy Clark, MS, RD, CSSD, editor of PULSE's Conference Highlights, author of Nancy Clark's Sports Nutrition Guidebook *(4th edition), and sports dietitian in private practice at Healthworks in Chestnut Hill, MA.*

Carbohydrate Oxidation During Exercise

Hulston CJ, Wallis GA, Jeukendrup AE. Exogenous CHO oxidation with glucose plus fructose intake during exercise. *Med Sci Sports Exerc.* 2009;41:357-363.

Optimizing carbohydrate (CHO) oxidation rates during high-intensity exercise leads to improved performance, particularly when multiple carbohydrate sources are utilized and exogenous carbohydrate ingestion rates are maximized at 1.5 to 2.4 g CHO per minute. However, ingestion rates of 90 to 144 g CHO per hour far exceed typical CHO intakes of athletes and, therefore, provide limited application. This study investigated carbohydrate oxidation at more typical ingestion rates of 0.8 g CHO per minute (48 g CHO/h) to evaluate whether glucose + fructose would still produce higher oxidation rates than glucose alone. In this single-blinded, crossover study, seven endurance-trained cyclists received 600 mL of water (WAT), 6% glucose (GLU), and 6% glucose + fructose (GLU+FRU) in randomized order pre-exercise and 150 mL every 15 minutes during 150 minutes of cycling at 65% VO_2max. Diet and exercise were controlled prior to each experimental trial, and experimental trials were separated by at least 7 days. At baseline and every 15 minutes, breath samples (^{13}C enrichment; VO_2; VCO_2) and blood samples (glucose and lactate) were collected. Results showed higher carbohydrate oxidation rates after exogenous carbohydrate supplementation, but no differences between GLU and GLU + FRU trials (P >.05). Based on these findings, GLU and GLU + FRU combinations are equally effective exogenous carbohydrate sources during exercise when ingestion rates are in amounts typically consumed by endurance athletes and below the predicted CHO intestinal transporter saturation rate of 1.1 g per minute (~70 g/h).

Summarized by Kelly Ping, RD, sports nutrition graduate student, University of Colorado at Colorado Springs, CO.

Protein-supplement Timing and Strength, Power, and Body Composition

Hoffman J, Ratamess N, Tranchina C, et al. Effect of protein-supplement timing on strength, power, and body-composition changes in resistance-trained men. *Int J Sport Nutr Exerc Metab.* 2009;19:172-185.

Robust research has established that acute ingestion of protein and/or amino acid supplementation can reduce muscle damage, attenuate force decrements, and enhance recovery from resistance training in untrained or recreationally-trained subjects. Few studies have investigated the effect of protein timing during prolonged resistance training in trained strength and power athletes. The purpose of this study was to examine the role of protein timing on strength, power, and body composition in resistance-trained athletes participating in a10-week off-season strength and conditioning program. Thirty-three participants were randomly separated into three groups. Group 1 received a supplement containing 42 g protein, 2 g carbohydrate, and 0 g fat in the morning and evening; group 2 received the same supplement prior to and immediately after each training session; and group 3 served as the control (resistance training without supplementation). All groups completed an identical, supervised training program and were tested pre- and post-training for their one repetition maximum (1RM) in the bench press and squat exercises, peak and mean power output for these exercises, and body composition via dual energy x-ray absorptiometry (DEXA). Although each group experienced increases in strength and power, no statistically significant differences were observed between groups (P>.05). There were no significant changes in body composition among any of the three groups (P>.05). Within the scope of this study, timing of protein ingestion does not influence strength, power, or body composition over a 10-week period in trained athletes. This study was supported by a grant from IDS Sports.

Summarized by Justin Robinson, MA,RD,CSSD,CSCS, director of strength & conditioning, RU Sports Performance Center, San Diego, CA.

Effects of Environmental Temperature on Energy Intake

Shorten AL, Wallman KE, Guelfi KJ. Acute effect of environmental temperature during exercise on subsequent energy intake in active men. *Am J Clin Nutr.* 2009;90:1215-1221.

Previous research has shown that exercise has an acute effect on appetite and subsequent food intake. A myriad of factors mediate this effect, including the temperature (T) at which the exercise bout is performed. The purpose of this study was to determine the effect of exercise performed in the heat on subsequent energy intake in 11 active males. Participants completed three experimental trials: exercise in the heat (HEAT; 36° C), exercise in a neutral T (NEUT; 25° C), and a resting control (CON) in randomized counterbalanced fashion. The exercise trials, performed in a fasted condition in a climate-controlled chamber with 7 days between visits, consisted of treadmill running for 40 minutes at 70% VO_2peak. Participants were permitted to consume foods ad libitum from a buffet-style meal of known quantity and nutrient composition for 30 minutes following each trial. There were no differences in energy expenditure or excess post-exercise oxygen consumption between exercise trials (P >.05). Energy intake after NEUT was greater than CON (P <.05) but similar between

HEAT and CON. However, relative energy intake (REI; energy intake corrected for the energy cost of the exercise session) was significantly lower for HEAT than CON ($P < .05$). Although it did not reach statistical significance, REI for HEAT was approximately 800 kilojoules lower than for NEUT. The current investigation suggests that aerobic exercise in a warm environment is more conducive to creating a negative energy balance in the short term. Because this study assessed only energy intake during the immediate postexercise period and did not assess total daily energy intake, care should be taken when interpreting the results.

Summarized by James Stevens, MS, RD, visiting assistant professor, Metro State College of Denver, Denver, CO.

Carbohydrate Mouth Rinsing and Time-Trial Performance

Beelen M, Berghuis J, Bonaparte B, et al. Carbohydrate mouth rinsing in the fed state: lack of enhancement of time-trial performance. *Int J Sport Nutr Exerc Metab.* 2009;19:400-409.

Carbohydrate (CHO) intake during exercise has been shown to delay fatigue and improve performance in both prolonged and short high-intensity exercise, most likely through different mechanisms. Recent studies suggest that CHO mouth rinsing in the fasted state improves short high-intensity cycling, possibly through an increased central drive mediated by glucose receptors in the mouth. The purpose of this study was to determine if CHO mouth rinsing was equally effective in a practical setting (i.e., following a high-CHO meal). In this double-blind, counterbalanced study, 14 male endurance-trained competitive cyclists completed two simulated 1-hour time trials (predetermined amount of work based on 75% maximal workload capacity) on a cycle ergometer, separated by 7 days. Participants consumed a standardized breakfast 2 hours prior to both time trials. They rinsed their mouth for 5 seconds with 25 mL of either 6.4% maltodextrin solution or water preexercise and every 12.5% of the set amount of work. Rate of perceived exertion (RPE) was recorded every 25% of the set amount of work. Power output and heart rate were monitored continuously. The results showed no significant difference in performance time, RPE, average power output, or heart rate ($P > .05$). Based on the results of this study, a CHO mouth rinse is not ergogenic for short-term high-intensity efforts in the fed condition.

Summarized by Raphael Blesi, graduate student, sports dietetics emphasis, Division of Nutrition, University of Utah, Salt Lake City, UT.

SCAN Notables

by Michele Barrack-Gardner, PhD, MS

■ **Debra M. Vinci, DrPH, RD,** associate professor at the University of West Florida (UWF) Department of Health, Leisure, and Exercise Science, was awarded a $134,000 grant from the U.S. Department of Education's Model Alcohol or Other Drug Abuse Prevention Program on College Campuses. The grant will fund *UWF: You Have Choices!*—a comprehensive, evidenced-based program that utilizes environmental strategies coupled with social norms marketing and informational, knowledge, and motivation-based interventions to help reduce high-risk drinking among college students.

■ **Roberta Schwartz Wennik, MS, RD,** author of several books including *Is Your Personality Type Making You Fat?* and creator of the nutrition monitoring system *Drawing the Line,* recently released the online service *Spin-a-Recipe*™, a fun recipe decision-maker site. A percentage of the Web site's profits will be donated to Heifer International, an organization seeking to end world hunger by promoting environmentally-sound, sustainable development in poverty-stricken countries.

■ **Tammy Beasley, RD, CSSD,** a previous Recognized Young Dietitian of the Year in Florida, recently published her first book—*Rev It Up! The Lifestyle Diet that Puts YOU in the Driver's Seat*. She also was interviewed by *Oxygen* magazine for its December supplement issue.

■ **Cathy Kapica, PhD, RD,** vice president of Global Health and Wellness at Ketchum Communications and adjunct professor at Tufts University, costars as The Lazy Cook ™ in the video blog series *The Lazy Cook and The Crazy Cook,* where she demonstrates how to eat healthfully without spending a lot of time in the kitchen. Her "anti-cooking" style contrasts with that of the kitchen-loving Crazy Cook as they tackle food challenges involving pancakes, smoothies, Mexican cuisine, and more.

■ Coathors **Nancy Clark MS, RD, CSSD** and soccer guru Gloria Averbuch welcome their new book this spring—*Food Guide for Soccer: Tips from the Pros*. This colorful "how to" guide is designed for athletes and soccer parents alike. Included are tips and recipes from members of Women's Professional Soccer Teams as well as an abundance of nutrition information to help soccer players train and compete well at home, on the road, and at tournaments.

■ The author of the first edition of *The American Dietetic Association Guide to Private Practice,* **Faye Berger Mitchell, RD,** has partnered with Ann Silver on its revision. Scheduled for

release this spring, the revised edition contains updates on technology and reimbursement along with new chapters on electronic practice, consulting to the media, public speaking, and writing for hire.

■ **Lilah Al-Masri, MS, RD, CSSD,** has coauthored *100 Questions and Answers About Sports Nutrition and Exercise,* due for release this spring. The book provides dietitians, coaches, athletes and other healthcare professionals with "bottom line" information on various topics relating to sports nutrition and exercise.

■ **Yvette Quantz, RD, CLT,** a private practice dietitian, and **Kate Rountree, RD,** a dietitian at the Southwest Surgical Weight Management Center, have recently been appointed the new state media representatives for the Louisiana Dietetic Association.

■ **Julie C.H. Brake, MS, RD,** is a charter board member of Supporting Others Achieve Recovery (SOAR), a new nonprofit organization in Atlanta, GA. SOAR provides eating disorder recovery services, volunteer opportunities for those who have recovered, and healthy meal groups. Services may be helpful for those transitioning from inpatient treatment to outpatient settings as well as for college students living apart from friends and family.

If you have an accomplishment that you would like to be considered for an upcoming issue of PULSE, please contact Michelle Barrack-Gardner, PhD, at michellebarrack@gmail.com/.

# of Further Interest

■ SCAN Symposium '10: Don't Miss It!

Although the 2010 SCAN Symposium is fast approaching, there's still time to register for this popular conference, slated for March 28-30 in San Diego, CA. Featuring the theme *Myths, Mysteries & Realities of Eating and Metabolism,* this event will spotlight emerging science and insights on energy balance, sports nutrition, cardiovascular health, and wellness, with an emphasis on disordered eating issues. For more details, visit SCAN's Web site (www. scandpg.org).

■ Register Today for Culinary Pre-Symposium

Find your inner chef and fuel your passion for food and nutrition at the unique Culinary Fusion session—the only free pre-Symposium program. Scheduled for March 27, this interactive session will blend nutrition science with culinary tips for making simple, healthful ingredient substitutions. Attendees will prepare a delicious meal, with the latest trends and techniques for healthy eating demonstrated. Registration is required and attendance is limited. Go to www.scandpg.org to register.

■ Take Advantage of ADA's Online Job Service

ADA CareerLink is ADA's online job service that allows members to post resumes, target searches by specialty and geographic location, respond directly to job listings, and receive e-mail alerts about new positions. For a fee, you can also recruit professionals for your organization. Access this membership service at ADA's Web site (www.eatright.org), under the *Career Center* tab in the Member section.

■ News from Sports Dietetics USA (SD-USA)

Here's an update on SD-USA developments:

• **Sports Nutrition Educational Programs.** Consideration is being given to a fall 2010 or 2011 Sports Nutrition Workshop at the U.S. Olympic Training Center in Colorado Springs, CO. Stay tuned for announcements and more information.

• **2010 CSSD Exam.** Join the many sports dietitians who have earned the Board Certification as a Specialist in Sports Dietetics (CSSD) credential from the Commission on Dietetic Registration (CDR). The next window for the CSSD exam in July 12-July 20, 2010 (application postmark deadline: April 30, 2010). You can obtain eligibility information and applications from CDR at www.cdrnet.org.

• **Share SCAN's Video: *Sports Nutrition—Who Delivers?*** View the video on SCAN's Web site (www.scandpg.org) and YouTube. Enhance your visibility and marketability by adding a link to the video in your email signature.

• **Sports Nutrition Fact Sheets.** Download the latest handouts at www.scandpg.org (under the *Nutrition Info* tab as well as the *Sports Nutrition* tab ("Professional Resources"). Bulk orders of fact sheets personalized with your contact information are now available.

• **Sports Nutrition Mentor Program.** Experienced sports RDs share their knowledge with professionals entering the sports nutrition arena. Those interested in becoming a mentor or a mentee should complete the application form on the Sports Nutrition Mentor page at www.scandpg.org (under the *Careers and Students* tab).

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

Upcoming Events

March 28-30, 2010
Join your SCAN colleagues at the **26th Annual SCAN Symposium,** *Myths, Mysteries & Realities of Eating and Metabolism,* to be held at the Sheraton Hotel and Marina, San Diego, CA. Come a day early for Pre-Symposium events! For more information: www.scandpg.org

April 24-28, 2010
Experimental Biology (EB) Annual Meeting, Anaheim, CA. For information: www.faseb.org

June 2-5, 2010
American College of Sports Medicine, 54th Annual Meeting, Baltimore, MD. For information: www.acsm.org

July 12-30, 2010
CDR Sports Dietetics Specialty Examination (at various U.S. sites). Postmark deadline for applications is **April 30, 2010.** For information: Commission on Dietetics Registration, www.cdrnet.org.

July 17-22, 2010
35th Annual National Wellness Conference, University of Wisconsin, Stevens Point, WI. For more information: www.nationalwellness.org.

SCAN'S PULSE

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

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