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CONTENTS

Pleasure Overrides Fullness When It Comes to Controlling Food Intake

by Ralph E. Carson, PhD, RD

One method for controlling food intake is to stop eating when you feel full. This ability is assumed to be programmed into our natural homeostatic feedback design. Being aware of fullness supposedly will adequately indicate when we have had the appropriate amount of food to maintain our energy stores and sustain our "natural weight." Going beyond this hypothetical point could lead to overconsumption, weight gain, and obesity. When asked about what indicates fullness, clients trained in this technique will reply, "It is a feeling of tension or pressure in the stomach." By honoring fullness, it is assumed that the individual will stop overeating and binge eating will end. However, this internal message of "listening to your body" may not always reliably indicate to clients when they have had enough to eat, leading to the question: Do stomach cues unequivocally provide permission for clients to trust their body signals? This article examines various factors regarding fullness and the body's role in overriding fullness cues.

Gastric Stimulation: Fullness Cues

The gastric electric stimulator (GES) is an implanted device that manipulates gastric signals and produces a sense of fullness.[1,2] With the GES, the consumption of food trips a sensor that sends a signal to the device. Electrical activity within the stomach muscles sends continuous waves from the entry and eventually the outlet of the stomach. The gastric stimulator quickly "tricks" the brain into registering fullness by stimulating these stomach muscles. Thus, the GES is expected to increase feelings of fullness, reduce food intake, prevent overeating, and contribute to weight loss.

Several assessments have concluded that there is insufficient scientific evidence to support gastric stimulation .[3-5] Shikora et al compared implantable gastric stimulation therapy with a standard diet and therapy regimen in a group of obese subjects and evaluated differences in weight loss.[6] The results did not support GES application because it failed to produce any significant weight loss when compared with diet and exercise.[7,8] Those losing less than 5% body weight seem to have powerful conditioned responses that override regulatory signals. The general consensus of these studies is that people cannot self-regulate food intake relying solely on homeostatic feedback.[9]

Vagal Nerve Blockage: Hunger Cues

The vagal nerve plays a significant role in modulating sensations of feeling hungry. Cutting the vagal nerve decreases appetite and reduces weight. Although vagal stimulation has a crucial role in signaling hunger, there is little evidence suggesting that it also plays a significant role in long-term weight maintenance.[10]

VBLOC® vagal blocking therapy consists of a device designed to intermittently block the vagus input from the stomach to that part of the brain linked to hunger.[11] Periodically, the device delivers an electronic impulse that blocks hunger impulses and leaves the patient feeling fuller, reducing food intake and lowering body weight. The device produced an overall difference in total body weight of only 3% more than a control device that did nothing.[12] Although there was clinically significant weight loss, the procedure fell short of being as effective as the researchers had hoped. The advisory committee for the U.S. Food and Drug Administration recommended approval based on the fact that the VBLOC® helped some people lose weight and keep it off. The lasting power of the device beyond 18 months is unclear. The VBLOC® device does not address behavioral and lifestyle changes that include incorporating healthy eating habits, making healthy choices, addressing emotional eating, or promoting physical activity. The effectiveness of vagal blockage begs to question whether one can rely on stomach cues of hunger to determine how much to eat. Researchers recommend diet and exercise over vagal blocking devices for long-term durable treatment of weight.[13]

Gastric Capacity

Do obese individuals have a larger stomach capacity? Studies of gastric emptying in normal-weight and obese persons have shown inconsistent results.[14] Using an intragastric balloon, researchers showed that the stomach was larger in obese individuals.[14-16] People with a larger maximal volume can tolerate more food. Areas of the brain responsible for stress and pain are activated by gastric distension, and it has been shown that a larger stomach capacity associated with obesity produced less activation of these loci.[17]

Obesity may not result primarily from a large gastric capacity. Normal-weight binge eaters have an even larger gastric capacity than the obese.[16,18] As the degree of obesity increases, the likelihood of binge eating also increases. This provides a possible explanation of why the gastric capacity of morbidly obese individuals is so large.[19]

Eating for Pleasure (Hedonic Hunger)

There is a belief that if one tunes into his or her physical and mental fullness signals, the likelihood of preventing mindless overconsumption is increased. Research is continually finding that regardless of how full a person may feel, the body is hard-wired to chemically reward itself by overeating when tempted with highly palatable foods.[20-22]

Hedonic hunger refers to consumption of food solely for pleasure and not to maintain energy homeostasis. In this condition, the subject not only eats when in a state of short-term energy depletion, but also overconsumes specific foods because of their rewarding properties.[23]

Ghrelin and 2-Arachidonylglycerol

Two gut compounds are credited with causing us to indulge in goodies well beyond the point of caloric need. The stomach hormone ghrelin regulates the drive to eat and the capacity to experience pleasure. The endocannabinoid 2-arachindonylglycerol (2-AG) is also involved with appetite and pleasure. These chemicals override fullness when a person wants a particular food. We are programmed to stuff ourselves for a

From The Editor

It's About Time

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

I'm amazed that you're already reading our last issue of 2016, but that just goes to show how easily time slips away. I just hope you can find the time to squeeze all of the contents of this issue into your busy schedule, because it will be time well spent. If you don't, here's what you'll be missing:

Our cover article by Ralph Carson, PhD, RD describes how pleasurable perceptions of food affect the overall satiety regulation and food intake. You might consider taking advantage of our free CPE article that our own Kristine Spence, MS, RD, CSSD has written on promotion of optimal bone health in female athletes. While it's still 2016, you won't want to pass up the chance to read the article by Alice Henneman, MS, RDN and Linda Boeckner PhD, RDN discussing the roles of pulses (no, not our publication, but rather dried beans, peas, and lentils) in promoting good nutrition. Lastly, Steven Collins MS, RDN, Elizabeth Koustis, MS, RD, and Arianna Aoun, MS, RD, CSR provide an original research article on their comparison of the VA MOVE! Program for Veterans to two commercial weight loss programs.

You should also take the time to peruse our usual departments such as "SCAN Notables,""Reviews,""Conference Highlights," "Of Further Interest," the letter from our Chair, and "Research Digest." And keep in mind that we'd love to hear feedback from you anytime.

rainy day. Despite feeling full, faced with an appealing food one eats more than originally intended.

As noted previously, our innate predisposition to overeat when presented with tempting food may overrule feelings of fullness.[25,26] This response can be blamed on a brain that is preprogrammed to store up energy for future famines. It is a natural consequence of existing in an environment where food was difficult to obtain. Ghrelin and 2-AG levels become elevated when appealing food is available, and this triggers us to stuff ourselves. The behavior is counterproductive in an environment where there is an overabundance of cheap food.[24]

Ghrelin stimulates some people to keep eating enjoyable foods even after they are full. Mice who received ghrelin continued to push buttons with their noses to get high-fat pellets long after those who had not received the hormone gave up.[28] Humans and mice share similar architecture in the "pleasure centers" of the brain—the same neurocircutry, neurohormones, and reward centers, according to researchers at University of Texas Southwestern Medical Center.[28] Ghrelin is reduced in humans following roux-en-y-gastric bypass (RYGB) or the vertical sleeve gastroplasty (VSG). As a result, postsurgery patients have a decreased preference for highly palatable foods.[29] Functional magnetic resonance imaging revealed that ghrelin-activated areas in the brain are involved in reward-seeking behaviors. When participants ate their favorite food, their blood levels of ghrelin increased significantly and stayed high for 2 hours following ingestion. After eating an unappetizing nutritionally equivalent item, ghrelin levels progressively decreased.[30,31]

Hedonic signals release messengers that stimulate cannabinoid receptors.[32] These receptors are implicated in the drive to continue eating.[25] Highly palatable foods trigger continuation of eating regardless of fullness.[33] Consumption of a favorite food allowed 2-AG levels to remain higher for up to 2 hours compared with the non-favorite food.[25] In overweight and obese people, 2-AG levels are significantly increased.[34] This leads to an increase in food seeking, absorption of more sugar, burning less sugar, and ultimately storing more fat.[35]

In summary, there is a pleasure system in the brain that responds to food. Studies show there are higher levels of endocannabinoids in overweight and obese people. Higher circulating levels are correlated with body mass index.[36] The primary mechanism is the endocannabinoids effect on appetite, sugar metabolism, and fat storage. Certain individuals will continue eating whether or not they are full, because they cannot resist the pleasure stimulus.

Pleasure Overrides "Fullness"

After years of sporadic dieting, can one discern if he or she is experiencing true hunger? Mind hunger creates an imaginary feeling of hunger that is persistent. Being full and being satisfied are not the same thing.[37] Some people might eat a high-fiber cereal instead of chocolate ice cream and find themselves consuming so much fiber they feel like they will explode—yet they may still feel unsatisfied and crave something that tastes good.

What determines when and how much we eat?[38] Our bodies have a homeostatic system that stimulates or inhibits eating. Messages are sent from the digestive tract to the brain that informs us that we are hungry or full. The mechanism includes gastric expansions that activate the vagus nerve or neurohormonal chemical messages that travel to the brain's feeding center.[39] There is also a hedonic feedback that drives us to eat because food tastes good.[40] A dysfunction in either systems could result in overeating that contributes to obesity or binge eating.[41]

Highly Palatable Foods Disrupt Fullness Signals

For decades our bodies had been accustomed to whole foods from natural sources rather than highly processed food. Disrupting this balance has led to a confused brain and inappropriate fullness feedback that can result in obesity.[42]

The body controls food intake by balancing a need to survive (homeostatic) with a desire for pleasure (hedonic). Pleasure incorporates such senses and perceptions as taste, smell, mouthfeel, and appearance. Defective brain signaling shifts the balance between these systems, causing pleasure to take over. This may explain why humans overeat on a highly palatable diet, even when they are full. Over time this ultimately impairs the ability to control caloric intake.

Ralph Carson, PhD, RD is vice president of Science and Innovation – CORE Program for the Eating Recovery Center and consultant to Pine Grove's behavioral health and addictions services. He is author of The Brain Fix: What's the Matter with Your Grey Matter *and* Harnessing the Healing Power of Fruit. *He has been involved in the treatment of eating disorders, obesity, and addiction for more than 40 years and is a board member of the International Association of Eating Disorder Professionals.*

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"A dysfunction in either systems could result in overeating that contributes to obesity or binge eating." [41]

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CPE article

Nutrition for Optimizing Bone Health in the Female Athlete

by Kristine Spence, MS, RD, CSSD

This article is approved by the Academy of Nutrition and Dietetics, an accredited Provider with the Commission on Dietetic Registration (CDR), for 1 continuing professional education unit (CPEU), level 1. To apply for ***free*** *CPE credit, take the quiz on SCAN's website (www.scandpg.org/nutrition-info/pulse-newsletters/).Upon successful completion of the quiz, a Certificate of Completion will appear in your My Profile (under the heading, My History). The certificate may be downloaded or printed for your records.*

Learning Objectives

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

- Describe the impact of energy metabolism and energy availability on bone accrual.
- Discuss the roles of estrogen, delayed menarche, and dietary calcium in bone health, and identify patterns among youth that may lead to inadequate serum calcium concentrations.
- Assess an athlete's vitamin D status based on various factors, and make recommendations regarding dietary intake and sun exposure.

The body's skeleton is metabolically active, and this perpetual remodeling is orchestrated by the coordination of multiple body systems. From neural stimulation to sympathetic response and cellular action, the cascade of reactions that enables bone remodeling is tightly regulated by energy metabolism and the availability of essential nutrients. Exactly how bone maintains its integrity and the inter-variability between people is a complex science dependent on myriad genetic, lifestyle, and dietary components not yet fully understood. A 2016 updated position statement from the National Osteoporosis Foundation highlights the fact that lifestyle choices influence 20% to 40% of adult peak bone mass (heritable factors account for the other 60%-80%) and identifies diet and physical activity as the two factors with the greatest influence.[1]

Skeletal turnover is governed by two primary mechanisms: 1.) serum calcium levels, determined by such factors as dietary quality and hormonal status, modulate when remodeling takes place, and 2.) skeletal stress, determined by exercise type, intensity, and duration, dictates where remodeling takes place. As the female athlete engages in sport, she subjects

her body to various skeletal stressors, yet without adequate nutrition, bone cannot respond properly and remodeling uncouples. This may lead to increased risk of injury, failure to achieve peak bone mass, or in severe cases, osteoporotic fracture. The onset of puberty is a critical time for bone development, as the introduction of sex hormones dramatically increases growth and bone accretion. Young females achieve ~37% of peak bone mass between the ages of 11 and 15 years.[2] By age 20, young adults have achieved 90% of peak bone mass (PBM).[3]

This article focuses on dietary factors that impact bone health, with special attention given to those nutrients identified in the Osteoporosis Foundation's 2016 position statement as having a strong or moderate impact on bone mass, specifically calcium and vitamin D. A more complete list is presented in a chapter in *Nutrition and the Female Athlete: From Research to Practice* (CRC Press, 2013),[4] from which this article is adapted. A list of bone-specific nutrients and dietary reference intake (DRI) recommendations, as well as the nutrient composition of various foods to promote bone health, are shown in Table 1.

Energy Intake and Availability

Before examining individual nutrients, it is important to understand the fundamental role of basic energy metabolism. The body requires a certain amount of energy from food in order to function. Each of the body's operational tasks—from basic, involuntary metabolism (e.g., pulmonary function, cellular respiration, cardiac function) to voluntary locomotion, including exercise—has an energy cost. As female athletes increase their exercise duration and intensity, they "up the ante" and require additional calories to support increases in energy expenditure. The concept of energy availability is defined as dietary energy intake minus exercise energy expenditure.[5] When energy availability is low, the body does not have enough calories to support the energy demands of metabolism plus the added demand of exercise. The result is a potentially damaging cascade of hormonal, neurological, and physiological reactions that can lead to compromised bone health.[6]

For many years, prevailing wisdom suggested that hypoestrogenism was the primary cause of bone loss in amenorrheic young women; however, recent research on female athletes with low energy availability suggests that energy metabolism and the availability of adequate calories are at the root of maintaining bone health through its impact on both hormonal and metabolic pathways. In an observational study of 44 exercising premenopausal women, De Souza et al showed that as long as energy intake was adequate, estrogen status did not impact bone turnover.[7] Inadequate energy intake was, however, associated with bone loss due to decreased formation as well as increased resorption.[7] This research suggests that available energy may be the key modulator to sustaining bone health.

As described by Ihle and Loucks and cited in the American College of Sports Medicine's 2007 position stand on the female athlete triad,[8] dipping below the threshold of 30 kcal/kgLBM/day disrupts leutinizing hormone pulsatility in exercising women, which directly impacts reproductive and bone health. Athletes looking to maintain weight and achieve optimal bone health should target an energy availability of 45 kcal/kgLBM/day.[9]

Calcium

Calcium is the body's most abundant mineral, and its physiological role in bone health is primarily structural, as it provides the crystalline rigidity necessary for proper skeletal and dental mechanics. Despite this important structural role, the body's blood levels of ionized calcium take priority. Serum calcium exerts critical metabolic functions that impact protein utilization, nerve transmission, muscle contraction, blood clotting, and cellular communication, and these levels are tightly regulated. In fact, the body will pull calcium from bone reservoirs, potentially compromising bone health, in order to maintain appropriate serum levels.[3]

During the young adult and adolescent years when bone is growing most rapidly, especially 2 to 3 years surrounding puberty, calcium balance reaches its positive peak at 200 to 400 mg/day.[10,11] This is a sign that formation is outpacing resorption and the reason why dietary guidelines are highest (1,300 mg/d) for this age group. Data consistently show that adequate calcium consumption during these peak growing years contributes to attainment of PBM, reduces age-related bone loss, and decreases risk for fragility fractures both in youth and adults.[12,13] In fact, retrospective studies demonstrate that childhood calcium intake is a predictor of adult bone mass.[12] Results from National Health and Nutrition Examination Survey (NHANES) data (2005–2006) show that calcium intake among females is consistently lower than Dietary Guidelines recommendations and lower than those of their male counterparts. Specifically, 90% of females aged 14 to 18 years failed to meet the 1997 Adequate Intake (AI) level of 1,300 mg/day. In younger girls aged 9 to 13 years, 88% fail to meet the AI; in older women aged 19 to 30 years, 72% fall short of recommendations.[14] This trend does not make an exception for adolescent athletes. In a group of 39 high school runners, Barrack et al identified that consuming less than the recommended 1,300 mg/day of dietary calcium was a significant predictor of elevated bone turnover. In runners with heightened bone turnover, 85% had less than adequate intakes of dietary calcium.[15] Health professionals should be aware of these inadequacies and remain vigilant of athletes' dietary patterns that may further decrease calcium intake (i.e., vegetarianism, veganism, or other patterns in which dairy consumption is low).

Table 1: Bone-Specific Nutrients and DRI Recommendations / Nutrient Composition of Foods to Promote Bone Health

	Protein g/kg/d	Calcium mg/d	Fluoride mg/d	Iron mg/d	Magnesium mg/d	Phosphorus mg/d	Potassium mg/d	Sodium mg/d	Zinc mg/d	Vit. D[1] µg/d	Vit. K µg/d	Vit. C mg/d	Vit. A[2] (RAE) µg/d
Recommendations (Females)		(RDA)	(AI)	(RDA)	(RDA)	(RDA)	(AI)	(AI)	(RDA)	(RDA)	(AI)	(RDA)	(RDA)
9-13 y	0.76	1,300	2	8	240	1,250	4,500	1,500	8	15	60	45	600
14-18 y	0.71	1,300	3	15	360	1,250	4,700	1,500	9	15	75	65	700
19-30 y	0.66	1,000	3	18	310	700	4,700	1,500	8	15	90	75	700
31-50 y	0.66	1,000	3	18	320	700	4,700	1,500	8	15	90	75	700
51-70 y	0.66	1,200	3	8	320	700	4,700	1,300	8	15	90	75	700
>70 y	0.66	1,200	3	8	320	700	4,700	1,200	8	20	90	75	700
Foods (amount)	**Protein g**	**Calcium mg**	**Fluoride mg***	**Iron mg**	**Magnesium mg**	**Phosphorus mg**	**Potassium mg**	**Sodium mg**	**Zinc mg**	**Vit. D µg**	**Vit. K µg**	**Vit. C mg**	**Vit. A (RAE) µg**
Almonds (1 oz)	6	75	--	1	76	137	200	--	.87	--	--	--	--
Almond beverage (1 c)	1	450	--	.36	12.4	14	180	150	.16	3.75	--	--	70
Apricots (100 g ~1/3 c)	1.2	19	--	.94	11	25	411	4	.14	--	1.1	0.3	64
Bell pepper, red (1/2 c)	0.75	5	--	.32	9	19	157	3	.19	--	3.7	95	117
Black beans (1/2 c)	7	42		2.3	42	130	369	400	.65	--	--	3.3	--
Broccoli (1c raw)	2.6	43	--	.66	19	60	288	30	.37	--	92.5	81.2	28
Cereal, fortified (Cheerios) (1 c)	3.2	114	--	8.9	40	122	171	160	4.4	1	0.9	6.8	242
Cheese, mozzarella part skim (1 oz)	7	222	--	.06	7	131	24	175	.78	0.1	0.5	0	36
Chicken, breast (100 g ~3 oz)	31	15	--	1.04	29	228	256	74	1	-.1	0.3	0	6
Kale (1 c)	2.21	90	--	1.14	23	38	299	29	.29	0	547.4	80.4	515
Milk, skim (1 c)	8.26	299	--	0.07	27	247	382	103	1.03	2.9	0	0	149
Milk, chocolate low-fat (1 c)	8.1	290	--	0.68	32	258	425	152	1.02	2.8	0.2	2.2	145
Mushrooms (1/2 c)	1.08	1	--	0.17	3	30	111	2	0.18	0.1	0	0.7	0
Oatmeal (3/4 c – cooked)	4.45	16	--	1.57	47	135	122	7	1.75	0	0.5	0	0
Orange juice, fortified (1 c)	1.69	500	--	0.32	27	117	443	5	0.17	3.5	0	83.7	5
Pasta, whole wheat (1 c)	7.46	21	--	1.48	42	125	62	4	1.13	0	1.0	0	0
Peanut butter (2 T)	7.7	14	--	0.61	51	102	238	5	0.89	0	0.2	0	0
Plums (1/4 c dried)	.95	19	--	0.4	18	30	318	1	0.19	0	25.9	0.3	17
Potato (1 med)	4.5	31	--	1.85	52	123	952	24	0.61	0	3.5	14.4	2
Romaine lettuce (1 c)	0.58	16	--	0.46	7	14	116	4	0.11	0	48.2	1.9	205
Salmon, wild (3 oz)	21.62	13	--	0.88	31	218	534	48	0.70	^	--	0	11
Soy beverage, all flavors (1 c)	7	199	--	1.07	--	151	156	90	--	--	2.4	0	151
Steak, lean (3 oz)	19.98	9	--	2.19	20	182	322	78	4.68	--	--	0	0
Tofu (1/2 c)	19.88	861	--	3.35	73	239	299	18	1.98	0	--	0.3	--
Tuna, canned (3 oz)	20.08	12	--	0.82	28	184	201	320	0.41	1.7	2.1	0	5
Yogurt, plain (1 c)	14.04	488	--	0.22	47	385	625	189	2.38	0	0.5	2.2	5
Walnuts (1oz)	4.32	28	--	0.82	45	98	125	1	0.88	0	0.8	0.4	0

DRI = Dietary Reference Intake

[1] Vit. D recommendations are for cholecalciferol (Vitamin D_3); 1 µg = 40 IU

[2] Vit A recommendations are for retinol activity equivalents (RAEs); 1 RAE = 1 µg retinol, 12 µg β-carotene, 24 µg α-carotene, 24 µg β-cryptoxanthin

*Fluoride values are dependent on water source

^Value for Vit. D is not provided for whole fish or fillets, since it can vary greatly; 100 g canned salmon (drained solids, minus bones and skin) contains 21.5 µg

Sources: DRI Reference Tables Food and Nutrition Board, Institute of Medicine, National Academies; U.S. Department of Agriculture, Agricultural Research Service, USDA Nutrient Data Laboratory. 2011. USDA National Nutrient Database for Standard Reference, Release 24.USDA Nutrient Data Laboratory web site: http://www.ars.usda.gov/nutrientdata

Calcium is a unique nutrient in that the upper limit of its skeletal reserve is not only dependent on net calcium intake but also on mechanical load of bone.[16] This helps explain how exercise exerts an independent and positive effect on skeletal health. In female athletes, adequate calcium intake may help optimize the positive effects of exercise on bone,[17] yet research consistently shows that young females fail to meet calcium recommendations.[14,15,18] Because estrogen helps facilitate calcium movement into the bone, adolescent females with delayed menarche tend to have lower bone mineral density (BMD) than their normal menstruating counterparts, indicating one of the factors that contribute to this population's increased risk for fragility stress fractures and early-onset osteoporosis.[10] In addition to emphasizing adequate dietary calcium in this population, supplementation may be necessary in cases where diet is inadequate.

Working with this population can be challenging. Many young female athletes, especially those involved in lean-build and aesthetic sports, may be resistant and fearful of increasing their intake of calories. Thus, the sport dietitian and physician are encouraged to stress a diet with optimal nutrient density to help these athletes meet their needs.

Vitamin D

Research shows that vitamin D is essential for calcium and phosphorus absorption. Without it, only 10% to 15% of dietary calcium and 60% of dietary phosphorus is absorbed.[19] When vitamin D levels are maintained above 30 ng/ml, fractional calcium absorption is twice what it is in a vitamin D-deficient state.[20] Furthermore, vitamin D plays a key role in the endocrine modulation of calcium and phosphorus metabolism.[12] At serum levels below 10 ng/ml, parathyroid hormone (PTH) increases, thus stimulating osteoclast activity and bone resorption—two factors that correlate negatively with bone density.[20] Vitamin D also improves neuromuscular function and reduces risk for falls in the elderly.[18,19]

Among active individuals, vitamin D is important for the prevention of bone injury, as identified by a study of male Finnish military recruits in whom fracture risk increased when serum vitamin D dropped below 30 ng/ml.[21] A blinded intervention trial involving female naval recruits showed reduced stress fracture incidence following supplementation with 800 IU vitamin D and 2,000 mg calcium.[22]

"Calcium is a unique nutrient in that the upper limit of its skeletal reserve is not only dependent on net calcium intake but also on mechanical load of bone."[16]

Although more research needs to be done, Halliday et al, in their study involving college athletes, identified a significant correlation between low vitamin D status and frequency of illness. While much of the research that exists linking skeletal pain and vitamin D has focused on the elderly, reports show consistent correlation between low serum 25(OH)D and nonspecific musculoskeletal pain and weakness.[20]

We do know that many athletes are vitamin D-insufficient. The review on vitamin D and the athlete by Larson-Meyer and Willis identified a wide range (4-32 ng/ml) of serum concentrations depending on when (i.e., time of year) the measures were taken and where (i.e., latitude) the athletes lived.[23] The ideal serum concentration of 25(OH)D for optimal performance among a female athlete population remains unclear; however, the consensus among the existing literature is a range between 30 and 50 ng/ml.[20,24-26]

Assessing athletes' vitamin D status among other biochemical factors is suggested for determining an overall multidisciplinary approach to optimizing performance and health. Practitioners should also pay attention to the environmental conditions in which athletes train and compete (i.e., latitude, indoor, outdoor, time of day, etc.) and inquire about sunscreen use; this information will help assess status and guide recommendations. The latest Institute of Medicine (IOM) recommendations do not offer specific sun exposure guidelines;[11] however, sensible sun exposure has been described as exposure of the arms and legs for 5 to 30 minutes twice per week, with duration dependent on latitude, time of day, and season.[19] Recommendations for dietary intake should include those foods rich in vitamin D, namely fatty fish and fortified dairy products. Particular attention should again be given to athletes with specific dietary restrictions or disordered eating habits. In many cases including during winter months, supplementation may be the best course of action to maintain athletic performance and health throughout the year. Daily intakes of 800 to 2,000 IU per day are common[23] and still well below the IOM's established upper limit (UL) of 4,000 IU per day.[11]

Other Nutrients

While other nutrients (e.g., protein, magnesium, fluoride, iron, zinc, and vitamins A, C, and K) have been identified for the physiological roles they play in bone health, additional research is warranted to determine the strength of their dietary impact on peak bone mass.[1] Regardless of the need for further research, practitioners working with athletes to improve

bone health should focus on a whole-foods based diet.

Conclusion

Attention to diet throughout the athlete's life cycle is important for maintaining a lifetime of bone health; however, vigilance during the prepubertal and adolescent years, when bone is accruing most rapidly, will help athletes reach their genetically programmed PBM and reduce their risk for fracture later in life.

For practitioners and clinicians who work directly with female athletes, it is essential to keep in mind that applying this information to athletes' dietary patterns is crucial. While there are various nutrients that have been isolated as playing a particular role in enhancing bone health, the recent osteoporosis position statement emphasizes dairy foods and fruits and vegetables as those foods having the strongest association with peak bone mass.[1] Furthermore, many of the nutrients important for optimizing bone health interact synergistically within whole foods. Therefore, when making recommendations and discussing nutritional strategies to improve bone health in female athletes, health professionals should talk about foods and dietary patterns instead of honing in too closely on individual nutrients. Also, it should be emphasized that in many female athletes, especially those with low energy availability, inadequate energy intake means a deficit in macro- and micronutrients, making it imperative to advocate a nutrient-dense diet.

Kristine Spence, MS, RD, CSSD is senior vice president at the Dairy Council of Utah/Nevada, where she is head of all communication efforts, connecting people to agriculture and the research behind dairy foods. She also maintains her sport dietetics credential and consults on occasion.

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2016 Is the International Year of Pulses: Dried Beans, Peas, and Lentils

by Alice Henneman, MS, RDN and Linda Boeckner PhD, RDN

The 68th General Assembly of the United Nations declared 2016 the International Year of Pulses. The Food and Agriculture Organization of the United Nations (FAO) has been responsible for facilitating the implementation of the year. Learning more about pulses is important to registered dietitian nutritionists (RDNs), because pulses provide affordable health benefits to clients in addition to benefiting the overall health of our planet.[1]

Pulses are a leguminous crop harvested for their edible dry seed. A legume is "a plant that has its seeds in a pod, such as the bean or pea."[2] The term "pulses" differs from "legumes" in that pulses are a subgroup of legumes. "Legume" refers to the plant that contains the dry edible seed that is called a "pulse."[3] In the United States, we tend to use the word "legume" to refer to both the plant and the seed, such as when pulses are discussed in the United States Department of Agriculture's (USDA) MyPlate food guidance system.[4]

Dry beans, peas, and lentils are among the most commonly consumed pulses. Pulses do not include leguminous crops that are harvested green such as green beans, green peas, and green lima beans. Nor do they include soybeans or leguminous crops used exclusively for sowing purposes such as clover and alfalfa seeds. Some familiar pulses include kidney beans, lima beans, navy beans, Great Northern beans, chickpeas, black-eyed peas, split peas, and several varieties of lentils, especially brown lentils.[5]

Consumers may think pulses are difficult to include in healthful diets due to time constraints or lack of information about food preparation. This article provides practical, consumer-friendly advice for clients, and discusses five key messages designed by the United Nations[6], along with ways to include pulses in everyday food patterns, as follows: 1.) pulses are highly nutritious; 2.) pulses are economically accessible and contribute to food security at all levels; 3.) pulses have important health benefits; 4.) pulses foster sustainable agriculture and contribute to climate change mitigation and adaptation; and 5.) pulses promote biodiversity.

Pulses Are Highly Nutritious

Pulses are small but mighty in nutrient content. In one study, consumption of approximately ½ cup of dry beans or peas resulted in higher intakes of fiber, protein, folate, zinc, iron, and magnesium, with lower intakes of saturated fat and total fat.[7] Pulses are associated with the following nutrient contributions:[3]

Protein

On average, pulses contain about twice the protein of whole grains.[8] Pulses do contain all nine essential amino acids, but the amount of some essential amino acids (e.g., methionine) may be relatively low. When viewed in the context of an overall diet providing complementary amino acids, pulses can be considered a key contributor of essential amino acids. Vegetable proteins such as grains, along with pulses, can help to meet overall dietary needs of essential amino acids. Consumption of a protein source of animal origin (including dairy products and eggs), or soy (classified as a legume, but not considered a pulse), or quinoa (a grain that is a complete protein source) also fills in for the lower levels of the essential amino acid, methionine. It is not necessary to consume these foods at the same meal. Inclusion of pulses in meals can be especially beneficial for individuals consuming vegetarian or vegan diets.

Complex Carbohydrates and Fiber

Pulses contain both soluble and insoluble fiber. Fibers are among the components of pulses that likely help to impart their low glycemic index.[9]

Low in Sodium

The sodium content in pulses that are cooked from the dry form without added salt or sodium-containing ingredients is negligible.[10] Canned, cooked pulses are higher in sodium; however, versions of pulses canned without salt or with reduced amounts of salt are available in many stores. Research with canned beans showed draining and rinsing beans reduced sodium by 41%.[11]

Low in Fat

As with sodium, the amount of fat in pulses is often negligible.[10] While some pulses such as chickpeas may contain naturally occurring fat, much of the fat content in pulse dishes is primarily derived from added fats during cooking.

Folate

Pulses are listed among the foods considered excellent sources of folate.[12]

Iron

Pulses are a source of non-heme iron, the only type of iron found in plant sources. Iron-containing foods from animal sources provide both heme and non-heme iron. Heme iron is absorbed better than non-heme iron. To increase the absorption of non-heme iron, clients for whom pulses may be a major iron source should be advised to include some ascorbic acid/vitamin C foods in meals with pulses. Examples include citrus fruits, tomatoes, strawberries, cantaloupe, cabbage, Brussels sprouts, and kiwi fruit.

Magnesium, Zinc, Potassium

Pulses are a source of these important micronutrients. A Canadian survey indicated that pulse consumption was associated with fewer individuals whose intake was below the average requirement for these nutrients.[13]

Gluten-Free

Pulses can be eaten by people who cannot tolerate gluten-containing foods: wheat, barley, and rye.

Pulses Are Economically Accessible and Contribute to Food Security

"Food security" as defined by the FAO is "a situation that exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life."[14] Affordability and reduced food waste are two important characteristics of pulses.

Affordable Source of Protein and Minerals

Overall, dry pulses are less expensive than canned ones. As an example, on average a 1-pound bag of dry pinto beans costs $0.15 per serving; canned pinto beans (store brand) cost $0.34 per serving; and canned pinto beans (national brand) cost $0.48 per serving.[15]

Low Food Wastage

Food waste is one of the main contributors to food insecurity. In the United States, 31% or 133 billion pounds of the available food supply at the retail and consumer levels were uneaten in 2010.[16] This represents 387 billion calories of consumable food, or 1,249 of 3,796 potential calories per person, that were not available per day.

FAO's Food Wastage Footprint model indicates that the contribution of pulses to food waste, including the carbon footprint and blue water footprint of pulses, is low in all regions.[17]

Because dry pulses are very shelf-stable, waste at the consumption stage is low. When dry pulses are stored in tightly sealed containers in a cool, dry, dark area, they maintain their quality and nutrition for at least 1 year, and often longer. For periods longer than 12 months, or when exposed to undesirable conditions, they may not soften sufficiently when cooked, regardless of how long they are soaked or cooked.

According to USDA, low-acid canned foods, such as canned pulses, remain shelf-stable for 2 to 5 years when stored in a cool, dry place. Use of bulging, rusted, leaking, or deeply dented cans should be avoided. Date labeling on a can of pulses does not represent an expiration date; rather, it reflects the date the manufacturer has determined the food will still be of a desirable quality.[18]

Pulses, whether cooked from the dried form or from an opened can, should be eaten within 4 days of cooking. Cooked pulses should not be left at room temperature more than 2 hours. Cooked pulses should be refrigerated in shallow pans; clients should be advised to avoid storing pulses in their original cooking pot. Cooked pulses freeze well; directions provided by Henneman[19] for freezing beans also will work on other types of pulses.

Pulses Have Important Health Benefits

Weight Loss/Maintenance

In comparison to diets without a pulse intervention, diets that included about ¾ cup pulses daily were associated with moderate weight loss (slightly more than ½ lb) when consumed over a period of 6 weeks in 21 clinical trials. Pulses have a low glycemic index and break down slowly, helping people feel full longer.[20]

Heart Disease

Heart-healthy substances in pulses include fiber, folate, and low levels of saturated fatty acids. The same research that showed a modest loss of weight also showed a 5% drop in low-density lipoprotein (LDL) cholesterol.[20]

Certain Types of Cancers

Higher consumption of pulses may be linked to a lower risk of some cancers such as colorectal cancer, but the evidence is limited at present.[21,22]

Diabetes

The soluble fiber and low glycemic index of pulses can slow the absorption of sugar and help improve blood glucose levels.

Constipation

Pulses are likely of value for gastrointestinal motility, since fiber-rich diets may help prevent constipation.

Celiac Disease/Gluten Sensitivity

Pulses provide important nutrients and contribute to varied and palatable meals. They can provide substance and flavor to soups, casseroles, and other dishes when pastas cannot be eaten. Pulse flours may assist in establishing the structure of gluten-free pasta and increase the nutritional content of gluten-free foods.[23]

Spina Bifida

Because pulses are rich in folate, they may help reduce the risk of neural tube defects such as spina bifida in newborn babies.

Pulses Foster Sustainable Agriculture

"The nitrogen-fixing properties of pulses can improve soil fertility, which improves and extends the productivity of farmland," according to FAO.[3] Using pulses in intercropping systems and as cover crops may reduce soil erosion and help with pest and disease control.

Pulses Promote Biodiversity

Biodiversity

FAO states that pulses are able to increase biodiversity because they are able to fix their own nitrogen into the soil, which increases soil fertility. A higher soil biodiversity (i.e., a more diverse mixture of living organisms in the soil) provides greater resistance and resilience against stress and increases the ability of ecosystems to suppress diseases.[24]

Table 1. Preventing Problems with Gas When Consuming Pulses

- Increase the addition of pulses into meals slowly, both in amount and frequency (e.g., start with a small serving only once or twice a week).
- Drink more water when consuming pulses (and other fiber-containing foods).
- Rinse and drain canned beans before eating them.
- Rinse dry beans after soaking and cook them in fresh water.
- Use a product such as Beano®, which contains an enzyme that breaks down the gas-producing substances.

Table 2. Eight Easy Ways to Incorporate Pulses into Meals

- Add to pasta dishes.
- Toss into salads.
- Puree and use in dips, such as a traditional hummus recipe.
- Add to casseroles
- Mix into soups and stews.
- Substitute for part of the animal-based protein in foods.
- Add beans to burritos, tortillas, and tacos.
- Spread sandwiches with hummus (pureed chickpeas) instead of mayonnaise.

Genetic Diversity

Hundreds of varieties of pulses provide for genetic diversity. A more diverse gene pool increases the likelihood that at least some of the plants will survive a crop disease or other form of attack.[23]

Incorporating Pulses into Everyday Food Patterns

Dried beans, peas, and lentils are unique foods and may be counted as either MyPlate's protein group or vegetable group; however, the same serving cannot be counted in both groups at the same time. One-fourth cup of cooked beans, peas, or lentils counts as 1 ounce equivalent in the protein group. If sufficient foods are eaten from protein foods, any additional pulses may be counted in the vegetable group as part of the beans and peas subgroup. One-half cup of cooked pulses counts as ½ cup of vegetables.[4]

Pulses are available in dried, canned, and frozen form. Although the dried form takes longer to prepare from start to finish, the actual hands-on time is low. A free booklet, *Pulses: The Perfect Food,* written by Garden-Robinson, RDN, nutrition specialist at North Dakota State University Extension Service, includes preparation directions and recipes for incorporating pulses in meal plans and special diets.[25] This downloadable booklet is recommended by the FAO. Dry beans need soaking before cooking, whereas lentils and split peas do not. Garden-Robinson's booklet gives directions for cooking dry beans "from scratch," including the soaking process.[25]

Beans may cause bloating and gas. The other pulses also have this property. Table 1 gives helpful coping strategies.

It is likely that an increase in the consumption of pulses will come from incorporating them into other dishes rather than eating them as a separate food item. Table 2 suggests easy ways clients can add pulses to their meals.

Conclusion

Pulses have many health benefits. As Hakan Bahceci, president of the International Pulse Trade and Industries Confederation, said of the 2016 Year of Pulses: "This is the greatest opportunity in a century to give pulses the attention they deserve."[26] For more information about pulses and materials for promoting pulses, visit the United Nations/FAO website at: www.fao.org/pulses-2016/en.

Alice Henneman, MS, RDN is an extension educator at University of Nebraska–Lincoln Extension. She specializes in providing practical, science-based, actionable nutrition information to both consumers and multiplier groups working with consumers through two international electronic letters and the food.unl.edu website. Linda Boeckner, PhD, RDN is a Nebraska Extension specialist focused on health and wellness education.

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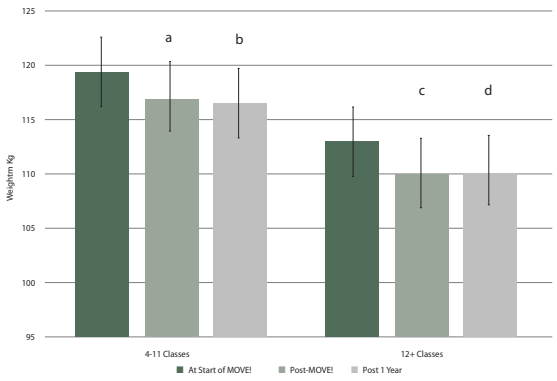
Comparison of Weight Loss Achieved with the MOVE! Program for Veterans, the Atkins Diet, and Weight Watchers

by Steven Collins, MS, RDN; Elizabeth Koustis, MS, RD; and Arianna Aoun, MS, RD, CSR

The increase in prevalence of overweight (body mass index [BMI] ≥25 kg/m^2) and obesity (BMI ≥30 kg/m^2)[1,2] in the United States is well documented.[3] Chronic disease such as type 2 diabetes, hypertension, and cardiovascular disease are strongly associated with obesity.[4,5] Alarmingly, 64.8% of U.S. adults and 72.2% of American veterans who use the Veterans Health Administration are classified as overweight or obese.[6,7]

In an attempt to reduce the obesity epidemic, many commercial weight loss programs such as the Atkins diet and Weight Watchers have emerged. The Atkins diet was introduced in 1972 with a focus on carbohydrate restriction; Weight Watchers was introduced in 1963 and focuses primarily on calorie restriction.[8] Offering an alternative to these programs, the VA National Center for Health Promotion and Disease Prevention (NCP) developed, piloted, and launched the VA MOVE! Weight Management Program for veterans, described elsewhere.[6] Both Atkins and Weight Watchers have been around for decades, whereas MOVE! has existed for only 9 years. All three programs have demonstrated success in helping with weight loss, but no research has compared their effectiveness in promoting weight loss and weight maintenance, defined as ≤2.3 kg.[9] The aim of the present study was to compare the initial weight loss achieved with Atkins and Weight Watchers to that achieved with MOVE! and compare participants' weight maintenance after 1 year. Because MOVE! encompasses a multidisciplinary approach of nutrition, physical activity, and behavior change to weight loss, we hypothesized that veterans who used the MOVE! program will lose more

Figure 1. Weight change (Kg, SE) pre-, post-, and post-1 year enrollment in the MOVE! Weight Management Program separated by the number of classes attended at Louis Stokes Cleveland VA Medical Center, 2012



[a]*P*=.003
[b]*P*=.002
[c]*P*=.02
[d]*P*=.04

weight than individuals who followed the Atkins diet or Weight Watchers.

Methods

Participants

This study (a retrospective chart review) was approved by the Louis Stokes Cleveland Department of Veteran Affairs Medical Center (LSCDVAMC) institutional review board. Veterans who received their primary care at LSCDVAMC were included. The electronic medical records of the first 100 MOVE! participants enrolled January 17, 2012 through May 29, 2012 were reviewed. Veterans were included in the study if they attended at least four MOVE! classes within a 6-month time frame and had a BMI of at least 25 kg/m^2. Veterans were excluded from the study if they attended fewer than four MOVE! classes within 6 months, had a BMI less than 25 kg/m^2, were younger than 18 years, had received a medical diagnosis of diabetes less than 6 months from the start of his/her first class, or had inconsistent recorded heights. Other exclusion criteria were a diagnosis of end-stage renal disease, chronic obstructive pulmonary disease (COPD), or liver disease; currently undergoing active cancer treatment; a history of bariatric surgery; or no recorded weight 11 to 13 months after attending his/her last MOVE! class.

Of the 100 records screened for the study, 52 were excluded (22 for no post-1 year MOVE! weight; 17 for attending <4 classes; 3 for diabetes diagnosis within 6 months of program start; 3 for COPD; 3 for no start weight; 1 for active cancer treatment; 1 for no post-MOVE! weight; 1 for inconsistent recorded height; and 1 for not finishing the program prior to December 31, 2013). Veterans were referred to MOVE! by their primary care provider if they were overweight and/or had comorbid conditions, such as type 2 diabetes, hypertension, and hyperlipidemia.

Data Collection

The following data were collected for each study participant: first and last MOVE! class dates; pre-MOVE!, post-MOVE!, and post-1 year weight and height; total number of classes attended; comorbidities; age; gender; and ethnicity. The baseline weight of veterans who attended 4 to 11 sessions versus those who attended 12+ sessions was compared with veterans' 6-month weight. The weight changes from baseline to 1 year following their last class were assessed. The findings from our data collection and the findings from previously reported studies[8] were compared.

Weight Measurement

Pre-enrollment and post-enrollment weight was obtained from electronic medical records. Weight was measured and recorded by the medical staff during each MOVE! appointment. Pre-enrollment weights were recorded on the day of the participant's first MOVE! class. Weights were recorded the last day the participant attended MOVE! within 6 months of his or her first class. Post-enrollment weights were recorded 1 year after the participant's last MOVE! class, plus or minus 1 month to increase the likelihood of obtaining a valid weight from the medical records. Demographic characteristics, baseline weight, and comorbid conditions for the MOVE! participants were obtained, and all active medical diagnoses in their medical records were included in the analysis.

Statistical Analysis

Power calculations indicate that a sample size of 18 (~95% power, ∂=0.01) is required to detect a significant weight loss of 5 kg. The data were summarized using means, standard deviations, and standard errors. For comparisons between pre-MOVE!, post-MOVE!, and post-1 year MOVE! for participants attending 4 to 11 sessions and 12+ sessions, a one-sided paired t-test was used. Statistical analysis was performed using SAS JMP 11.1 Pro (SAS Institute Inc., Cary, NC). Statistical significance was set at $P<.05$.

Results

Demographic Characteristics

Of the 100 charts reviewed 48 veterans met the study criteria and were included in the data analysis. Demographic characteristics of the participants are shown in Table 1. The majority of participants were obese, with a BMI range of 31.0 to 39.7 kg/m^2. In addition to being overweight or obese, participants had at least one comorbidity, with the ma-

jority of participants having an abnormal lipid profile.

MOVE! participants who attended at least four sessions within 6 months and had a BMI of ≥25 kg/m^2 were included in the weight change analysis (n=48). Results from the one-sided paired t-test indicated that over a 6-month period of MOVE! attendance, participants who attended 4 to11 sessions lost an average of 2.5±0.8 kg (*P*=.003), and participants who attended 12 or more classes lost an average of 3.2±1.0 kg (*P*=.002) (Fig. 1).

From the participants' first MOVE! class until 1 year after their last class or after 6 months from their first class, those who attended 4 to 11 sessions maintained a weight loss of 2.8±1.4 kg (*P*=.02), and those who attended at least 12 classes maintained a weight loss of 2.9±1.4 kg from their baseline weights (Fig. 1).

Caucasian participants lost an average of 3.3 ± 0.8 kg (*P*=.0001) immediately post-MOVE! and 3.7± 1.2kg (*P*=.0024) 1 year-post MOVE!. There were no significant differences between Black/African American participants at the end of MOVE! and post-1 year (*P*=.1217; *P*=.3015, respectively) (Table 2).

The average weight loss observed following 6 months of the MOVE! program, independent of the number of sessions attended, was 2.8±0.6 kg. The average weight loss for Atkins and Weight Watchers participants at 6 months was 5.8±0.8 kg and 1.7±0.3 kg, respectively (see Table 3).
The average weight loss for the MOVE! program 1 year after the 6-month attendance period or last class was 2.8±1.0 kg. The average weight loss for Atkins and Weight Watchers 12 months after the start of their program was 6.9±0.5 kg and 4.6±0.9 kg, respectively (Table 3).

Table 1. Characteristics of Louis Stokes Cleveland Department of Veteran Affairs Medical Center (LSCDVAMC) Participants in the MOVE! Program, 2012

Characteristic	**LSCVAMC** (n=48)
Age	
Mean, y (SE)	59.7 (1.0)
Median, y (range)	61 (36-73)
No. missing (%)	0 (0)
Sex, n (%)	
Female	1 (2.1)
Male	47 (97.9)
Unknown/missing	0 (0)
Weight status at enrollment (BMI, kg/m2), n (%)	
Normal weight (<25)	0 (0)
Overweight (>25 and <29.9)	6 (12.5)
Obese (>30 and <39.9)	28 (58.3)
Morbid obese (>40.0)	14 (29.2)
Weight at enrollment, kg	
Mean (SE)	116.8 (2.9)
Median	114.3
Range	79.2-169.4
Race, n %	
White	31 (64.6)
Black or African American	14 (29.2)
Mexican American	0 (0)
Unknown/missing	3 (6.2)
Comorbid conditions, n (%)[a]	
Abnormal lipid profile[b]	39 (81.3)
Hypertension	37 (77.1)
Type 2 diabetes	28 (58.3)
Obstructive sleep apnea	20 (41.7)
Gastroesophageal reflux disease	9 (18.8)
Coronary artery disease	6 (12.5)

[a] Study participants may have multiple comorbid conditions.
[b] This includes hyperlipidemia, dyslipidemia, hypercholesterolemia, hypertriglyceridemia, hyperlipidemia NEC/NOS, pure hypercholesterolemia, mixed hyperlipidemia.
BMI = body mass index

Discussion

We evaluated program effects of MOVE! in a sample of overweight and obese veterans by comparing pre-MOVE!, post-MOVE!, and post 1-year data to that of the commercial weight loss programs Atkins and Weight Watchers. Our results are consistent with those reported in 2013 by Romanova et al, who assessed the weight change from 1-year pre-enrollment in the MOVE! program to 1, 2, and 3 years post-enrollment at the Los Angeles VA clinic; they found that participants lost an average of 2.2±0.4 kg after the first year of the initiation of the MOVE! program.[10] Neither of the MOVE! programs had any controls for physical activity or diet during the 1 year follow-up.

Dahn et al[11] reported on the efficacy of the MOVE! program at VA Miami. They looked at veterans who attended their supportive group sessions, a 10-week multidisciplinary group intervention addressing nutrition, physical activity, and psychological topics related to weight loss. White, non-Hispanic participants had

an average weight loss of 2.7 kg per year, whereas this population in the LSCDVAMC MOVE! program lost 3.7 kg per year. However, marginally significant weight loss in the African American population was reported in the Miami MOVE! program but not in the LSCDVAMC MOVE! program. A greater effect on weight loss has been reported for group weight loss programs versus individual-based programs. Rigsby et al[12] reported on 545 female employees of a hospital or nursing home who volunteered for an 8-week weight loss program that consisted of either group meetings or individual weight loss counseling. The women who participated as a group lost significantly more weight than the women in the individual program. This research indicates a need for group programs such as MOVE! to help people lose weight, as study participants were less likely to lose more weight when they attempted to do it on their own.

The present study has significant limitations. We compared the effectiveness of the MOVE! program at Louis Stokes Cleveland Department of Veteran Affairs Medical Center to the previously published effectiveness of the commercial weight loss programs Atkins and Weight Watchers. Females comprised only 2% of our sample, while females make up 20% of military troops[13] and 50.8% of the United States adult population.[14] The LSCDVAMC offers a Women's MOVE! group

Table 2. Mean Weight Loss for Participants in the Louis Stokes Cleveland Department of Veteran Affairs Medical Center (LSCDVAMC) MOVE! Program, 2012

Ethnicity	Baseline, kg (SE)	Post-MOVE! Weight	Post-1 Year MOVE!	Mean Difference from Baseline	*P*-Value[a, b]
White (n=31)	117.1 (3.2)	113.8 (3.1)		-3.3 (0.8)[c,]	.0001
			113.4 (3.4)	-3.7 (1.2) [d]	.0024
Black/African American (n=14)	116.0 (6.7)	114.6 (6.7)		-1.3 (1.1) [c]	.1217
			115.0 (6.6)	-0.96 (1.8)[d]	.3015
Unanswered (n=3)	116.9 (12.0)	112.1 (13.1)		-4.7 (2.7)[c]	.1085
			114.2 (14.4)	-2.7 (3.4)[d]	.2553

[a]*P*-value was determined by one-sided paired t-test. [b]*P*-value <.05 was determined to be statistically significant.
[c]Mean weight difference between baseline and post-MOVE! weight
[d]Mean weight difference between baseline and post-1 year after MOVE!

Table 3. Baseline Characteristics and Weight Changes of Participants in the Louis Stokes Cleveland Department of Veteran Affairs Medical Center (LSCDVAMC) MOVE! Program, Atkins, and Weight Watchers, 2012

Characteristics	LSCVAMC (n=48)	Atkins[a] (n=40)	Weight Watchers[a] (n=40)
Demographics			
Age, mean y (SE)	59.7 (1.0)	47 (1.9)	49 (1.6)
Men, no. (%)	47 (98)	19 (47)	17 (42)
White race, no. (%)	31 (65)	32 (80)	30 (75)
Baseline			
Weight factors, mean (SE)			
Baseline BMI	37.3 (0.9)	35 (0.6)	35 (0.6)
Baseline body weight, kg	116.8 (2.9)	100 (2.2)	97 (2.2)
Post-Program / 6 mo.			
Mean (SE)	-2.8 (0.6)	-5.8 (0.8)	-1.7 (0.3)
Post-12 Mo. of MOVE! / 12 Mo. of Atkins or Weight Watchers			
Mean (SD)	-2.8 (1.0)	-6.9 (0.5)	-4.6 (0.9)

[a] Dansinger ML, et al. *JAMA*. 2005;293:43-53.
BMI = body mass index

to women veterans. Many women veterans who want to lose weight attended the Women's MOVE! classes but did not participate in the MOVE! classes reviewed for the study. Genetic and physiologic factors differentiate men and women,[15] necessitating evaluation of both sexes. Therefore, if our study had included more women our results may have been strengthened, because the data would have been more characteristic of the U.S. adult population. Furthermore, we were unable to obtain the full raw data from the Atkins and Weight Watchers study to statistically compare the weight loss from all three programs. We were only able to compare mean weight losses of LSCVAMC MOVE!, Atkins, and Weight Watchers. In addition, the participants' provider knowledge, prior referrals, program reputation, interest in inclusion of physical activity, convenience of meeting times,[16] and knowledge of women veterans attending the Women's MOVE! program could change the results. If the overall sample size had been larger, perhaps more values would have reached statistical significance.

We hypothesized that the MOVE! program would produce greater weight loss than Atkins and Weight Watchers. However, the MOVE! program produced less weight loss (2.8 kg at 6 months and post-1 year) than Atkins and Weight Watchers (5.8 kg and 1.7 kg at 6 months, and 6.9 kg and 4.6 kg after 1 year, respectively). Veterans can either self-refer to MOVE! or be referred by their primary care physician (PCP). This may influence the degree of weight loss demonstrated, because veterans referred by their PCP may not have the same level of health "buy-in" or motivation as that of a veteran who self-refers to the MOVE!, Atkins, or Weight Watchers programs. Another potential reason for these findings is that MOVE! is a relatively new program and, therefore, the best methods to teach veterans about weight loss are yet to be discovered. Further research is warranted to determine the best way to conduct a weight loss program for veterans that is as effective as commercial weight loss programs.

Steven Collins, MS, RDN is research coordinator and a dietetic intern/student at Louis Stokes Cleveland Department of Veteran Affairs Medical Center, Cleveland, OH. He is a veteran of the U.S. Marine Corps. Elizabeth Koustis, MS, RD is principal investigator and registered dietitian at Louis Stokes Cleveland Department of Veteran Affairs Medical Center, Cleveland, OH. Arianna Aoun, MS, RD, CSR is co-investigator and registered dietitian at Louis Stokes Cleveland Department of Veteran Affairs Medical Center, OH.

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From The Chair

'Tis the Season: Homecoming, SCAN-style

by Karen Collins, MS, RDN, CDN, FAND

Across the country, fall is the season for Homecoming. Regardless of whether you plan to enjoy your local or alma mater homecoming festivities, I urge you to consider this a season for a SCAN Homecoming. Think beyond the athletic contests, tailgates, and banquets typical of most homecoming activities—and savor the benefits that come from being part of SCAN.

The takeaways most people value from Homecoming are new connections made and old connections reinvigorated. Are you among the many SCAN members who work in settings that offer few other RDN colleagues with whom you can exchange ideas? If so, don't overlook what SCAN can do for you, both professionally and personally.

Disordered eating clients? Do you wish for a trusted colleague with whom you can check in regarding puzzling lab results, symptoms, or approaches for people with known or suspected disordered eating? Check out our "Ask the Doc Forum," accessed from the Disordered Eating and Eating Disorders (DEED) subunit's landing page on our website (www.scandpg.org). This benefit, available only to SCAN members, allows you to pose questions to private practice disordered eating physician Dr. Ed Tyson, and learn from questions posed by other SCAN members. SCAN leaders now refer to this as one of our "hidden gems," as we were surprised to discover through our latest survey that many members don't know this great asset exists!

Working in wellness? We've heard loud and clear that many SCAN members are currently working in wellness, and many more plan to do so in the next few years. As part of SCAN's strategic plan, we are working to help you hone vital wellness skills and learn how to nail down opportunities to use them. Sincere thanks goes to those of you who responded to our survey aimed at identifying how you'd like SCAN to help. Watch for exciting things ahead as our Wellness Task Force acts on the information you provided.

Sports nutrition your game? Many of you rely on SCAN fact sheets to provide current information for clients or presentations. Thousands of copies have been downloaded! Now SCAN sports nutrition experts have updated many of these popular handouts, so be sure to go to the Sports Dietetics-USA (SD-USA) subunit's home base on our website and get the latest versions. These fact sheets are free only to SCAN members.

Lone cardiovascular RDN on the health care team? Have you signed up as a member of our Wellness/CV electronic mailing list (EML)? With the EML, you never work alone, because you have a team of colleagues ready to share ideas and references. Recently one of our members asked for input on ideas for an upcoming presentation and was thrilled with the help received. This is just one example of how every week colleagues all across the country are supporting one another. To join any of our subunit EMLs, sign in on the SCAN website as a member, go to the "About Us" page, and scroll down the left sidebar to click on Electronic Mailing List Information.

Heads-up to all SCAN members: SCAN leaders recently spent a solid two-and-a-half days reviewing progress from the first six months of our new strategic plan and working on how to make sure we keep advancing toward our exciting goals. You can look forward to great new things on the near horizon in learning opportunities, tools you can use in practice, and ways to help you connect with others and get or stay on track with the goals you set.

Meet the SCAN All-Stars! If you're heading to Boston in October for the 2016 Food & Nutrition Conference & Expo™ (FNCE®), you won't want to miss our Sunday night SCAN Reception. Always a fabulous place to renew professional friendships and network to create new ones, this year's reception will include an opportunity to meet our SCAN All-Stars, a sampling of shining stars we've invited from each of SCAN's practice areas. SCAN's FNCE® Spotlight Session—*Going Coconut Over Saturated Fat? Why So Much Confusion?*—will feature national cardiovascular nutrition experts. You'll find a variety of other exciting SCAN events, too. SCAN leaders look forward to meeting you at our events and at the DPG Showcase, so please be sure to introduce yourself and give us a chance to connect with you!

To all SCAN members, long-time and new: Welcome Home!

Conference Highlights

American College of Sports Medicine Annual Meeting

June 1-4, 2016
Boston, MA

A record-setting 6,800 exercise scientists, sport dietitians, sports medicine physicians, and other health professionals enjoyed the 62nd Annual Meeting of the American College of Sports Medicine. Below are just a few highlights of some of the nutrition presentations that might be of interest to SCAN members.

Supplements and Sports

■ Should athletes take supplements of antioxidants, such as vitamins C and E? Probably not. Current research with athletes who took 400 mg vitamin E and 1,000 mg vitamin C suggests that these antioxidants hindered training-induced adaptations in the mitochondria. The vitamins also impaired the transport of glucose into the cells (reducing insulin sensitivity). Antioxidant supplements have not been shown to enhance heart health, but they have been shown to increase the risk for certain cancers. An athlete's best bet: Eat health-protective foods that offer a natural balance of antioxidants.

■ Is dehydration the primary cause of muscle cramps? Perhaps not. Studies with triathletes suggest that those who experienced muscle cramps were no more dehydrated than the triathletes who did not cramp. A history of cramping was the only factor that separated crampers from non-crampers. New evidence suggests that muscle cramps are strongly related to hyperactive muscle contractions in fatigued muscles. Stretching offers a mechanical solution. A nutritional solution includes "shocking" the nervous system. For example, a swig of pickle juice has been reported to stop a cramp within 35 seconds, even though the pickle juice barely has time to be absorbed. Sensors in the tongue taste the pungent flavor; this "shocks" the nervous system and disrupts the persistent firing of nerves that trigger the muscle to cramp. Other pungent cramp-stopping compounds include mustard, hot pepper, garlic, and wasabi.

■ The best sport fuel is one that quickly and efficiently replaces adenosine triphosphate (ATP) within the working cells—and that fuel is carbohydrate. While fat is a readily available source of fuel, fat does not restore depleted glycogen stores. Athletes who adapt to eating a high-fat diet need more oxygen to convert fat into energy. In addition, they "downregulate" their ability to metabolize carbohydrate. This helps explain why competitive athletes who rely on fat for fuel during intense exercise fail to perform better than those with higher availability of carbohydrate.

■ Anecdotes about high-fat ketogenic sports diets are currently influencing some endurance athletes to strictly limit their intake of carbohydrate, including fruits, vegetables, and grain foods. To date, sport science fails to indicate that highly competitive athletes will gain performance benefits from this type of very low carbohydrate, ketogenic diet. In a study with world-class race walkers, athletes who consumed carbohydrate before and during the exercise test (for high availability of carbohydrate for fuel) performed better than those who were in ketosis and had low availability of carbohydrate for fuel. They also reported feeling better than the low-carbohydrate eaters.

■ Dietary nitrates, commonly found in beetroot juice, have been shown to lower blood pressure, enhance mitochondrial respiration, reduce the oxygen cost of exercise, and boost immune function. High-nitrate foods (including beets and arugula) can also have a positive impact on athletic performance—at least in non-elite athletes. Research involving elite athletes, however, reveals mixed results. While some respond well to pre-competition beetroot juice, others do not experience improved performance. Nevertheless, athletes who were initially deemed non-responders became responders when given a higher dose of nitrates. Perhaps each athlete needs to surpass a unique baseline level of nitrates to receive benefits from beetroot juice?

■ Nitrates are available in powdered form via sodium nitrate. However, the nitrate from natural foods (beets, spinach, arugula) is more effective. A swig of *concentrated* beetroot juice shows a better response in blood nitrate levels compared with the regular beetroot juice. Consuming beetroot juice for 6 days pre-event is as effective as taking it consistently every day. The recommended dosage seems to be 8 mg/day to 12 mg/day nitrates for 6 to 15 days, with the final dose taken as beetroot concentrate or "beetroot bars" within 2 to 3 hours pre-event.

■ Digestion of dietary nitrates starts with bacteria on the tongue. While mouthwash reduces the bacteria available for the conversion of dietary nitrates into nitric oxide (the compound that triggers enhanced performance), most athletes use mild brands of mouthwash that do not impede performance benefits. Nevertheless, athletes wanting to get the most out of beetroot juice should forgo using pre-event mouthwash.

Weight

■ The microbiome of people with obesity differs from that of lean people. In mice, we know that obese mice harvest more calories from their food than do their lean counterparts. When researchers transplant gut microbes from obese mice into lean mice, the lean mice start to gain weight. The question remains: How much impact does the microbiome have on human body fatness?

■ Poor sleep is rampant in people with obesity. In a weight reduction study with 123 obese adults, those who slept the most lost more weight than those who were short on sleep (Chaput J, et al. *Obes Facts,* 2012). In another study with 77 men, a third of them had undiagnosed sleep apnea; they lost less weight than those who slept better (Borel A, et al. *Thorax,* 2012). Clearly, sleep is an essential part of a weight management program.

■ Consuming the majority of calories earlier in the day helps to maintain leanness. In a 20-week study with 420 people, the subjects who ate a late lunch lost less weight than those who ate an earlier lunch (Garaulet M, et al. *Physiol Behav,* 2014). Perhaps meal timing is important because diet-induced thermogenesis is lower at night and circadian rhythms that drive hunger are stronger at night compared with morning.

■ Should people in treatment for eating disorders be allowed to exercise? Traditionally, the answer has been no. The current research indicates no adverse effects, as long as the person is medically stable. Yoga, weightlifting, and 30 minutes of aerobic exercise have been shown to be beneficial in terms of greater muscle mass, fewer eating disordered symptoms, and better weight gain. Hence, exercise can be therapeutic for people with eating disorders—as long as it is in moderate doses and is seen as a way to relieve stress, encourage social interaction (as with tennis and basketball), and not just be an activity that "burns off calories."

Protein

■ Athletes need to pay attention to *when* they eat protein, not just *how much* protein they eat. An optimal protein intake offers about 20 g protein every 3 to 4 hours at breakfast, lunch, afternoon snack, and dinner. Serious athletes who want to optimize their muscle growth (and the elderly who want to reduce muscle loss) can benefit from another 40 g protein before bed. Research reveals better protein synthesis with 20 g protein consumed four times a day (80 g total) than with 10 g protein consumed eight times a day or 40 g protein consumed twice a day.

■ Protein needs should be based on body weight, not percent of calories. A suggested allotment is 0.25 to 0.3 g protein per kilogram body weight four times a day. Athletes who eat more than that (and most athletes do eat more than that) do not build bigger muscles.

Summarized by Conference Highlights editor Nancy Clark, MS, RD, CSSD, who has a private practice in the Boston area and is author of Nancy Clark's Sports Nutrition Guidebook*, available at www.NancyClarkRD.com.*

Reviews

Diabetes 365 Tips for Living Well

Susan Weiner, MS, RDN, CDE, CDN and Paula Ford-Martin
Demos Health, 11 West 42nd St, 15th Floor, New York, NY 10036
800/532-8663
www.demoshealth.com
2015, softcover, 133 pp, $16.95
ISBN 978-1-936303-91-5

Diabetes is a chronic disease that has prevailed in most recent years and is of great concern in today's society. Unfortunately there is no known cure for diabetes, underscoring the importance of effective management. *Diabetes 365 Tips for Living Well* prepares readers on how to control diabetes without feeling overwhelmed with information. The author guides the reader month-by-month for an entire year, providing the essential tools to understand and manage diabetes.

Being diagnosed with diabetes can be a challenging and frightening experience for many. Readers will find this book valuable, supportive, and informative. The book is organized with a month-by-month outline covering a variety of topics presented in short paragraphs. The information is straightforward and easy to read. Each month discusses seasonal foods, insurance, foot care, holiday eating, physical activity, medications, portion control, identification tags, glucometer, and referrals to other health care providers. The book strongly encourages gradual progress for healthy lifestyle habits in order to deal with the everyday challenges of diabetes. The tips delivered are useful for not only learning how to live with diabetes day by day but also learning how to manage it. Although living with diabetes may be complicated, the book offers reassurance that anyone can accomplish anything with diabetes.

The book sets a comforting tone and creates a sense of rapport with readers by addressing realistic ways to overcome the barriers that come with diabetes. The authors provide educational tips for good long-term management. The simplicity of the book serves to help individuals with diabetes, as well as family members, friends, and health professionals, better understand the daily struggles of this chronic disease.

Susan Weiner is a registered dietitian nutritionist and a certified diabetes educator. Paula Ford-Martin is a health writer and editor.

Reviewed by Janett Medrano, RDN at Family Health Centers of San Diego, CA

Protein Supplementation and Whole-Body Lean Tissue Accrual in Older Adults

Norton C, Toomey C, McCormack WG, et al. Protein supplementation at breakfast and lunch for 24 weeks beyond habitual intakes increases whole-body lean tissue mass in healthy older adults. *J Nutr.* 2016;146:65-69.

Older adults experience a 1% to 2% annual decline in lean tissue mass (LTM) after age 50, contributing to sarcopenia and frailty in this population. Research suggests that 25 g to 30 g of protein per meal is required to stimulate muscle protein synthesis (MPS) in older adults. However, breakfast and lunch meals in this group tend to be suboptimal in protein for MPS. The purpose of this study was to determine the effect of protein supplementation at breakfast and lunch for 24 weeks beyond current dietary intake on whole body LTM in male and female adults aged 50 to 70 years. In this randomized, single-blinded, controlled trial, participants were assigned to receive a supplement containing either a milk-based protein matrix with 0.165 g protein/kg body mass or an isoenergentic, nonnitrogenous maltodextrin control. Sixty participants completed the study. The protein group increased protein intake at breakfast and lunch to >0.4 g/kg at each meal, an amount considered optimal to stimulate MPS. Dual-energy X-ray absorptiometry measurements revealed a 0.45 kg increase in LTM in the protein group and a 0.16 kg decline in the control group ($P<.006$). There was no observed difference in body fat mass between the groups ($P<.58$). This study suggests that a more balanced distribution of protein throughout the day may preserve LTM in elderly clients, especially if they achieve >0.4 g protein/kg body weight per meal. This study was supported by Food for Health Ireland and Enterprise Ireland grant.

Summarized by Jessica LaRoche, MS, RD, CSSD, sports dietitian, US Speedskating, Salt Lake City, UT.

Mortality in Vegetarians Compared with Nonvegetarians in the U.K.

Appleby PN, Crowe FL, Bradbury KE, et al. Mortality in vegetarians and comparable nonvegetarians in the United Kingdom. *Am J Clin Nutr.* 2016;103:218-230.

While studies have found decreased incidence of disease among vegetarians compared with meat eaters, reported mortality rates have been mixed. This study combined the data from the Oxford Vegetarian Study with that of the EPIC Oxford Cohort Study to compare mortality from 18 common causes of death (including all-cause mortality) in approximately 60,310 (45,394 women; 14,916 men) vegetarians and nonvegetarians in the United Kingdom. Recruitment of participants was heavily weighted toward vegetarians, including vegans and pescatarians. Participants were divided into four groups for analysis: regular meat eaters (eat meat ≥5 times/wk), low meat eaters (eat meat <5 times/wk), fish eaters, and vegetarians or vegans. All-cause mortality was not different between diet groups. Compared with meat eaters, hazard ratios (HR) were as follows: vegetarians 1.02 (95% confidence interval [CI]: 0.94, 1.10); fish eaters 0.96 (95% CI: 0.86, 1.06); low meat eaters 0.93 (95% CI: 0.86, 1.00). Death from malignant cancers was significantly lower among fish eaters (HR: 0.82 [95% CI: 0.70, 0.97]) but higher in circulatory disease (HR: 1.22[(95% CI: 1.02, 1.46]) compared with meat eaters. Pancreatic cancer was significantly lower among low meat eaters (HR: 0.55 [95% CI: 0.36, 0.86]) and vegetarians (HR: 0.48 [95% CI: 0.28, 0.82]) compared with meat eaters. In addition, respiratory diseases and death from all other causes were significantly lower among low meat eaters (HR: 0.70 [95% CI: 0.53, 0.92; HR: 0.74 [95% CI: 0.56, 0.99], respectively) and lymphatic/hematopoietic cancers were significantly lower among vegetarians (HR: 0.50 [95% CI: 0.32, 0.79]) than meat eaters. Authors of this study speculate that U.S. participants from similar studies, whose results showed a reduction in mortality for vegetarians, more commonly chose vegetarianism for health benefits and thus tended to make healthier overall food and lifestyle choices such as eating fresh vegetables and fruits. Both vegetarianism and eating meat are choices that can support health. When assessing diet choice, it is helpful to consider an individual's risk for particular disease to make appropriate recommendations. The Oxford Vegetarian Study and the European Prospective Investigation into Cancer and Nutrition–Oxford are supported by the Medical Research Council (grant no. MR/M012190/1) and Cancer Research UK (grant nos. C8221/A19170 and 570/A16491).

Summarized by Chrissa Petersen, graduate student, Department of Nutrition and Integrative Physiology, Coordinated Master's Program, Nutrition, Education, and Research Concentration, University of Utah, Salt Lake City, UT.

Effects of Amino Acids and Caffeine on Sprint Exercise

Eaton TR, Potter A, Billaut F, et al. A combination of amino acids and caffeine enhances sprint running capacity in a hot, hypoxic environment. *Int J Sport Nutr Exerc Metab.* 2016;26:33-45.

Exercise in the heat, at altitude, or both contribute to more rapid central nervous system (CNS) fatigue characterized by impaired cognitive function and increased rate of perceived exertion (RPE). Some nutritional supplements such as essential amino acids (EAA) and caffeine may influence CNS fatigue, particularly in extreme environments. Therefore, the purpose of this study was to examine

whether supplementation with EAA and caffeine can attenuate central fatigue and reduce performance losses associated with a hot, hypoxic environmental stress. In this counterbalanced, double-blind study, eight male sub-elite trained football players completed a total of six sets of 4-second sprints with 8 seconds of rest between each sprint on a nonmotorized treadmill in a controlled low oxygen, hot simulated environment (15% 0_2, 30 °C, and 20% relative humidity) on four separate occasions, each preceded by a 48-hour dietary control (70% carbohydrate, 15% protein, 15% fat). A 10-minute break after three sets simulated halftime. On each occasion participants were given one of the four supplements in random order: placebo (CaCO3 capsule), caffeine only (3 mg/kg body mass capsule), EAA only (two doses of 7 g dissolved in 250 ml water), or caffeine + EAA. Supplements were administered 3 hours (placebos and EAA) and 1 hour (placebo, caffeine, EAA) pre-exercise. Blood samples, quadriceps electromyography (EMG), and quadriceps maximal voluntary contraction (MVC) were assessed at baseline (pre-supplement ingestion), at halftime, and immediately post-exercise. The results of this study found that caffeine + EAA was associated with significantly greater sprint work, power, and peak sprint velocity than EAA alone, greater venous blood oxygen than caffeine alone, and greater maximal voluntary contraction than placebo ($P<.05$). There also was an attenuated decline in EMG activity with caffeine + EAA than with placebo (19% difference, $P<.05$) or EAA alone (13% difference, $P<.05$). Central activation ratio was 2.7% greater with caffeine + EAA than with placebo ($P<.05$). The results from this study suggest that the combination of caffeine + EAA may help increase time to fatigue for athletes participating in team sports in hot, hypoxic conditions by prolonging muscle activation and central drive. This study was funded by the High Performance Sport Research Fund, Australian Institute of Sport.

Summarized by Eric Finley, MS, in Boston, MA.

SCAN Notables

■ **Jessica Redmond, MS, RD** was recently recognized by the New York Academy of Nutrition and Dietetics as the 2016 Emerging Dietetics Leader for New York State. She also presented a session at the NYSAND annual meeting entitled, "Exercise is Medicine: What RDNs Need to Know." Jessica is currently completing her PhD in Science Education at Syracuse University, and began her position as an assistant professor of biology at Utica College in August.

■ **Penny Kris-Etherton, PhD, RDN** and **Geeta Sikand, MA, RDN** served as co-chairs of the 2015 National Lipid Association Nutrition Recommendations for Patient-Centered Management of Dyslipidemia, which were published in the *Journal of Clinical Lipidology* (December 2015 issue). Four other dietitians also served on the committee including Julie Bolick MS, RDN; Carol Kirkpatrick,PhD, RDN; Kathy Rhodes, PhD, RDN; and Nancy Smith, MS, RDN.

■ **Bob Seebohar, MS, RD** recently had two new books released: *Sports Nutrition for Young Triathletes,* which discusses strategies to optimize nutrition for growth and development in younger participants of this sport, and the second edition of his book, *Metabolic Efficiency Training: Teaching the Body to Burn More Fat*. Bob is also founder of Kids that TRI, a non-profit organization that inspires youth to be more physically active through triathlon.

If you have an accomplishment that you would like to be considered for an upcoming issue of PULSE, please contact Michael Stone, MS, at stonemi13@aol.com, or Stone59@purdue.edu

# of Further Interest

News from Wellness/CV RDs Subunit

Here's an update on developments from the Wellness/CV RDs:

• **Join Us at FNCE®.** Heading to Boston soon for the 2016 Food & Nutrition Conference & Expo™ (FNCE®)? Be sure to attend: **1) SCAN's Spotlight Session,** *Going Coconut over Saturated Fat? Why So Much Confusion?* on Tuesday, October 18 at 8 a.m. Alice Lichtenstein, DSc and Carol Kirkpatrick, PhD, RD will present the strongest and most recent evidence on the relationship between saturated fat intake and CVD. **2) The SCAN Reception** on Sunday, October 16 from 6 to 9 pm. This will be a great chance to meet and connect with the Wellness/CV RDs leadership team and other SCAN colleagues. We'd love to hear about your suggestions for strengthening our subunit and get you involved as a volunteer! Check the SCAN website for location and additional information.

• **Webinar on Sugar Intake and CVD.** A new webinar exploring the link between sugar intake and cardiovascular disease will soon be available. Go to www.scandpg.org, click on "Professional Development" at the top of the page, and then click on "Professionals."

• **Do You Like to Write?** We're seeking authors for fact sheets and articles for the Wellness/CV RDs newsletter. Interested? Contact our volunteer coordinator, Sara Vine (sara.vine@gmail.com).

News from Sports Dietetics—USA (SD-USA) Subunit

Here are some highlights from the SD-USA subunit:

• **Updated! Graduate Sports Nutrition Programs and Certificates List.** Consider earning a graduate degree in a sports nutrition-focused program. You'll find information on this at www.scandpg.org/sports-nutrition-education-programs/.

• **Updated! Fact Sheets.** To make sure these popular resources reflect the most recent evidence-based information possible, SD-USA's fact sheet editing team has given them an overhaul! Be on the lookout for the following revised fact sheets in the coming months: *Alcohol & Athletic Performance, Caffeine & Athletic Performance, Eating Before Exercise, Eating During Exercise, Eating for Recovery, Eating on the Road, Exercise Hydration, Fueling the Pregnant Athlete, Nutrition for the Injured Athlete, Protein Needs for Athletes, Reversing Iron Depletion, Sports Foods, The Female Athlete Triad, The Sunny Side of Vitamin D, Vegetarian Eating for Athletes,* and *Weight Gain in Sports.* More revised and new fact sheets will be rolled out soon. As always, they are free for SCAN members.

• **Next CSSD Exam Windows.** The 2017 examination dates and fees were announced in August. For details, go to www.cdrnet.org. Check out the 20-minute webinar, *CSSD: Prepare Yourself and Succeed!* The webinar can be accessed under "Sports Nutrition Information" at www.scandpg.org. Click on "Become a CSSD."

• **New Webinar.** SD-USA's latest evidence-based webinar is *Eating Disorders in Athletes,* presented by RDs from SD-USA and DEED. The webinar offers 1 CPEU. For access, go to www.scandpg.org/store/default.aspx?search=Webinars.

• **Opportunities to Collaborate.** Get involved in these opportunities: **1) NATA Partnership:** If you work with athletic trainers, make sure they know about SCAN and the resources we offer. Encourage them to ask the National Athletic Trainers' Association (NATA) to continue collaborating with SCAN. Each of us plays an important role in the health and performance of athletes. If you have ideas to share, contact Jen Doane, MS, RD, CSSD, at jdoane@anwnutrition.com; **2) Athletes and the Arts (AATA):** This initiative of the American College of Sports Medicine (ACSM) and other organizations focuses on linking the sport athlete and musician/performing artist communities through collaborative exchange and application of wellness, training, and performance research and initiatives. Visit www.athletesandthearts.com and let SCAN and AATA know if you're working with performance athletes; and **3) PINES:** Join this international group that links professionals in nutrition, exercise, and sport around the globe to enhance sport nutrition services. Visit www.pinesnutrition.org

• **SD-USA Is Connected!** Keep up with the latest in sports nutrition by following SD-USA on Twitter at our new handle @SportsDietetics and linking to our renamed profile page at http:twitter.com/SportsDietetics.

News from DEED Subunit

Following are announcements from the Disordered Eating & Eating Disorders (DEED) subunit:

• **Interested in Writing? Presenting? Sharing Your Ideas?** Planning, creating, and editing DEED resources (fact sheets, e-newsletter content, webinars) are ongoing projects. Are you interested in writing or presenting a webinar for DEED? Do you have an idea for a new fact sheet? If so, contact DEED's director Sarah Gleason at Sarah@SarahTheDietitian.com. We're always looking for enthusiastic volunteers to contribute to and enhance the DEED subunit.

• **"Ask the Doc."** If you have medical concerns relating to a client, check out "Ask the Doc" on SCAN's website. Go to www.scandpg.org and then click on DEED's home page to take advantage of this special feature.

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Upcoming Events

October 15-18, 2015
2016 Food & Nutrition Conference & Exhibition™ (FNCE®), Boston, MA. SCAN events include the Member Meeting & Reception (Sunday), SCAN'S Spotlight Session on *Going Coconut Over Saturated Fat? Why So Much Confusion* (Tuesday), and more. For details: www. scandpg.org

October 31-November 4, 2016
Obesity Week, New Orleans, LA. For information: American Society for Metabolic & Bariatric Surgery and The Obesity Society, www.obesity.org/meetings/obesity-week

November 11-13, 2016
Annual Renfrew Center Foundation Conference, Philadelphia, PA. For information: www.renfrew.org

March 31 – April 2, 2017
Mark your calendar and plan to join your colleagues at the 33rd Annual SCAN Symposium, *Syncing Nutrition Science & Practice: Advancing Knowledge and Building Skills,* at the Sheraton Charlotte Hotel, Charlotte, NC. Watch for registration details at www.scandpg.org.

April 22-25, 2017
Experimental Biology (EB) 2017, Chicago, IL. For information: experimentalbiology.org/2017/Home.aspx

SCAN'S PULSE

Publication of the Sports, Cardiovascular, and Wellness Nutrion (SCAN) dietetic practice group of the Academy of Nutrition and Dietetics. ISSN: 1528-5707.

Appropriate announcements are welcome. Deadline for the Spring 2017 issue: **Dec.1, 2016.** Deadline for the Summer 2017 issue: **Mar. 1, 2017.** Manuscripts (original research, review articles, etc.) willl 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.

Send change of address to: Academy of Nutrition and Dietetics, 120 S. Riverside Plaza, Suite 2000, Chicago, IL 60606-6995.

Subscriptions: For individuals not eligible for Academy of Nutrition and Dietetic membership: $50. For institutions: $100, To subscribe: SCAN Office, 800/249-2875

To contact an editor listed above, visit www.scandpg.org (click Nutrition Info tab, then "SCAN's PULSE")