

NSCA's

# Performance Training Journal

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## Sports Nutrition

### Features

**Female Athlete Triad**  
*Juan Gonzalez PhD,  
CSCS and Aaron James*

**Where Do Vegetarians  
Get Their Protein?**  
*Juan Gonzalez PhD,  
CSCS and  
Ashley Eubanks*

**Metabolic Rate:  
How It Plays an  
Important Role In the  
Outcome of Your  
Client's Goals**  
*Dawn Weatherwax-Fall,  
RD, CSSD, LD, ATC,  
LAT, CSCS*



## about this PUBLICATION

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# Performance Training Journal

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# table of CONTENTS

## sports nutrition



- 8 [Female Athlete Triad](#)  
Juan Gonzalez, PhD, CSCS  
and Aaron James

Learn about the disorders associated with the Female Athlete Triad and gain knowledge on how to stay informed on relevant issues that may affect performance and health.

- 12 [Metabolic Rate: How It Plays an Important Role In the Outcome of Your Client's Goals](#)

Dawn Weatherwax-Fall, RD, CSSD, LD, ATC, LAT, CSCS

Discusses and explains how to properly assess a person's resting metabolic rate and describes why it is an important factor to consider when creating a workout plan.

- 10 [Where Do Vegetarians Get Their Protein?](#)

Juan Gonzalez, PhD, CSCS  
and Ashley Eubanks

This article discusses the proper measures one should take to perform at a high level while fulfilling all of the nutritional demands of your body.

## departments

- 4 [FitnessFrontlines](#)  
G. Gregory Haff, PhD, CSCS,\*D, FNCSA  
The latest news from the field on static versus dynamic warm-ups, the effects of warm-ups on performance, and an examination of the combination of whey protein and leucine in anabolic response times.

- 6 [In the Gym Eating for Your Health](#)  
Kyle Brown, CSCS  
This column offers tips to help change your diet to help reduce your risk of disease while exploring the link between specific foods and health risks.

- 14 [Training Table: Caffeine and Athletes](#)  
Debra Wein, MS, RD, LDN, CSSD,  
NSCA-CPT,\*D

The benefits and positive effects of caffeine are examined and compared to the detrimental side-effects on exercise performance.

- 16 [Ounce Of Prevention Post-Workout Recovery Nutrition](#)  
Jason Brumitt, MSPT, SCS,  
ATC/R, CSCS,\*D

The importance of post-workout recovery for your body is examined after addressing the top six concerns you should have when selecting a post-workout recovery drink.

- 18 [Mind Games Keep the Fire Burning](#)  
Suzie Tuffey-Riewald, PhD, NSCA-CPT  
This column explores some strategies to increase motivation during the cold winter months and how reinforcement plays a role in successfully completing goals.

about the  
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**If you must use static stretching in a warm-up it should be immediately followed by a sport-specific dynamic warm-up.**

It is widely accepted that static stretching inhibits performance in strength and power activities. While it is clear that static stretching causes these negative effects, many coaches still employ their use as part of pre-training or competition preparations. Researchers from the Australian Institute of Sport recently examined the effects of combining static stretching with a sport-specific dynamic warm-up in order to determine if performance decrements could be prevented. Thirteen netball players performed either a submaximal run followed by 15 minutes of static stretching and a netball-specific warm-up or a dynamic stretching routine followed by an identical netball-specific warm-up as part of a pre-training/competition protocol. Performance was assessed with the use of a vertical jump test and a 20m sprint test after the dynamic or static stretching portion of the warm-up and after the netball-specific warm-up. Results indicated that the static stretching protocol resulted in a significant reduction in vertical jump performance (-4.2%) and 20m sprint time (+1.4%) when compared to the dynamic stretching protocol. However, after the netball-specific warm-up there was no difference in vertical jump heights or sprint times between the two groups regardless of if static or dynamic stretching was performed as part of the whole warm-up protocol. Based upon these findings, it was concluded that if a static stretching regime is used, it should be immediately followed by a sport-specific warm-up protocol in order to prevent any of the harmful effects associated with static stretching. While the findings of the investigation are interesting, more research is warranted to determine if this phenomenon consistently occurs.

Taylor, KL, Sheppard, JM, Lee, H, and Plummer, N. Negative effect of static stretching restored when combined with a sport specific warm-up component. *J Sci Med Sport*. 12: 657 – 661. 2009.

**The effects of a neuromuscular warm-up programme on muscle power, balance, speed, and agility in female floorball players.**

It is well established in the literature that the warm-up protocol utilized can have an impact on the ability to express rapid movements. Recently, researchers from Finland examined the effects of a neuromuscular warm-up protocol which included sport-specific running technique, balance, jumping, and strengthening exercises on markers of performance. The neuromuscular warm-up protocol was assessed to 119 floorball players while 103 women were placed into a control group. The intervention was performed 1 – 3 times per week and took roughly 25 minutes to complete. The effects of the protocol were assessed by measuring static and countermovement jump height, jumping over a bar, balancing on a bar, and during a "figure 8" running test. After six months, it was determined that the intervention group was able to jump over the bar a greater number of times in 15 seconds and was able to balance on a bar for a longer time period. Based upon these findings, it was concluded that integrating specific activities into the warm-up which target running technique, balance, and jumping ability can result in an enhancement in performance characteristics.

Pasanen, K, Parkkari, J, Pasanen, M and Kannus, P. Effect of a neuromuscular warm-up programme on muscle power, balance, speed and agility- A randomised controlled study. *Br J Sports Med*. 2009.

**Strength and Power Parameters Predict Sprinting Performance.**

It is commonly accepted that stronger athletes have an advantage in performing sprinting-based activities as a result of their enhanced ability to apply vertical forces. Because of this relationship it may be warranted to examine the ability of markers of strength and power to predict sprinting performance capacity. Recently researchers from Greece examined the strength-power performance characteristics and sprinting ability in 25 male sprinters. Subjects were tested for squat jump height, countermove-

ment jump height, drop jump height, repeated jump capacity and 100m sprint time. The 100m sprint was assessed for reaction time and speed at 10 m, 30 m, 60m and 100m. The times collected were then used to calculate mean velocities at 0 – 10 m, 10 – 30 m, 30 – 60 m, and 60 – 100 m. The reactive strength index was calculated as the difference between the countermovement and squat jump heights. It was determined that strength-power parameters and reaction time as assessed in the present study explained 89.6% of the total variance seen in sprint time. Static jump, reactive jump, drop jump, and reactive strength index performance were highly correlated with mean velocities at all points throughout the 100m sprint. Based upon these findings, it is recommended to use squat jump, countermovement jump, reactive jump, and/or drop jump heights as performance assessments in order to determine the sprinters overall effectiveness in sprinting activities.

Smirniotou, A, Katsikas, C, Paradisis, G, Argeitaki, P, Zacharogiannis, E, and Tziortzis, S. Strength-power parameters as predictors of sprinting performance. *J Sports Med Phys Fitness*. 48: 447 – 454. 2008.

## Combining leucine with whey protein does not result in a greater anabolic response post exercise when compared to whey protein alone.

It is well accepted in the literature that leucine supplementation can result in an increase in muscle protein synthesis and anabolism. While it is clear that leucine is important in stimulating this response, it is less clear whether adding leucine to a whey protein supplement will result in greater anabolic effects when combined with a resistance training bout. Recently, researchers from the University of Texas Medical Branch in Galveston examined the effects of whey protein plus leucine on net protein balance in post-resistance training. Subjects performed an intense bout of resistance training which targeted the legs following the consumption of either a placebo (flavored water) or whey protein and leucine (16.6g whey + 3.4g leucine) drink. The arteriovenous amino acid balance across the leg was measured in order to determine the anabolic responses to the two treatment conditions. The arterial amino acid concentrations were significantly

higher after the consumption of the treatment beverage. These values peaked between 60 – 120 minutes post-consumption. The treatment beverage stimulated significant increases in leucine, threonine, and phenylalanine which remained elevated for 90 – 120 minutes following ingestion. Additionally, the uptake of leucine, threonine, and phenylalanine was elevated during the 5.5 hours of post-treatment consumption. When the results of this study were compared to previous investigations, it was determined that the combination of whey and leucine supplements did not result in significantly more anabolic responses than whey protein alone. Therefore, it appears that whey protein, on its own, is sufficient for inducing an increased anabolic response to resistance training. ■

Tipton, KD, Elliott, TA, Ferrando, AA, Aarsland, AA, and Wolfe, RR. Stimulation of muscle anabolism by resistance exercise and ingestion of leucine plus protein. *Appl Physiol Nutr Metab*. 34: 151 – 161. 2009.

about the  
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# Post Workout Recovery Nutrition: It's Not What You Digest But What You Absorb That Counts

Many athletes and weekend warriors alike give it their all in the gym with dreams of building muscle and burning fat—yet, their naiveté leads to self-sabotage by neglecting the most vital component. Muscle is not built and fat is not lost in the gym; these changes are made when you leave the gym by applying proper nutritional choices. Many athletes ruin their program by poorly refueling. They either rationalize that exercise will allow them to eat whatever they want or they neglect one of the most important meals of the day—the post-workout recovery.

Within the first 30 minutes to an hour of working out, your body has an anabolic (muscle building) and anti-catabolic (muscle sparing) window where you can capitalize on optimal gains. In order to achieve the highest yield on your workout investment, your body requires many different nutrients but there are six that are especially important: quality protein, quality carbohydrates and dietary oils, quality water, electrolytes, and enzymes.

## Top 6 concerns in a post workout recovery drink:

### 1. Quality Protein

Biological Value (BV) refers to how well and how quickly your body can actually use the protein you consume.

It is becoming common knowledge that whey is superior to other proteins for post-workout recovery drinks. Yet not all whey protein is the same. The adage, “you are what you eat” needs to be modified to “you are what you eat, eats.” In the case of whey protein, grass-fed whey protein trumps commercial whey protein isolates and concentrates. Nearly all whey protein products are a processed,

isolated or concentrated byproduct from grain and soy-fed cows that are pumped full of hormones and antibiotics. Instead, choose a native whey protein from a grass-fed cow, as it will be more beneficial for rapid tissue repair, muscle building, and immune support. It is glutamine rich and high in Branch Chain Amino Acids (BCAAs) and fat-burning CLA (2).

### 2. Quality Carbohydrates

Your muscles are the most susceptible to storing glycogen during post-exercise. Yet still, any carbohydrates you ingest that are not burned as fuel or stored in the muscle cells will be stored as body fat. Small amounts of carbohydrates from fruit are the best choice and will also add more fiber to your shakes. On the other hand, standard recommendations like maltodextrin (grain-based starch) or 75 grams of dextrose are poor choices if you are trying to lose body fat while gaining muscle.

### 3. Quality Oils

Healthy dietary oils work better than carbohydrates for fuel and the cholesterol is needed as a precursor to all your natural anabolic hormones. Without cholesterol, we can't make many hormones including testosterone, estrogen, pregnenolone, or DHEA in our bodies. You need to have high enough levels of cholesterol in your body to manufacture optimal quantities of these fat and muscle-building hormones.

**4. Quality Water**

Proper hydration is essential for post-exercise recovery. The beauty of a post-workout recovery drink is that you are able to ingest quality nutrients and properly rehydrate simultaneously. You should drink roughly 1 quart for every 50 pounds of bodyweight and ideally that water should be alkaline.

**5. Electrolytes**

Vital minerals like potassium and sodium are essential for post-workout recovery as they are lost while sweating during prolonged workouts. Many sea salts are rich in minerals like sodium, potassium, calcium, magnesium, and more.

**6. Enzymes**

It is not what you digest but what you absorb that counts. Digestive enzymes will break down the ingredients into nutrients that your body can readily digest and more efficiently absorb. ■

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# Female Athlete Triad

Juan Gonzalez, PhD, CSCS and Aaron James

## Running Head: Female Athlete Triad, Eating Disorders

The drive to excel in college athletics is so powerful that many young women forego their health in hopes of demonstrating improvements. One prevalent and potentially dangerous example of this is with the desire for weight loss. Many female athletes are told that losing weight will increase their athletic performance. Some of these athletes have taken this to extremes, participating in disordered eating practices such as Anorexia Nervosa and Bulimia Nervosa. These disorders can lead to dangerously low body weights resulting in the syndrome known as the Female Athlete Triad.

The Female Athlete Triad refers to the relationships among energy availability, menstrual function, and bone mineral density that may have clinical manifestations including eating disorders, functional hypothalamic amenorrhea, and osteoporosis (1). This is a serious condition that has affected many female athletes in the United States. This condition was first defined in a special American College of Sports Medicine conference in Washington, D.C. in June of 1992. It is believed that up to fifty percent of elite female athletes exhibit some kind of eating disorder. Quantifying the exact number of female athletes who may have this condition is difficult.

What many researchers have discovered is that there is a lack of knowledge about the Female Athlete Triad among female athletes and how it relates to sports performance. It is believed that this lack of knowledge may hinder the performance in their respective sports through recurring stress fractures and decreased bone densities. This knowledge among female athletes is mixed regarding eating disorders, amenorrhea, osteoporosis, and performance. Athletes and strength and conditioning professionals are faced with these issues daily; therefore, efforts must be made to make certain that athletes have complete and accurate information regarding the Female Athlete Triad. Failure to do so may leave at-risk athletes vulnerable to eating disorders, amenorrhea, and osteoporosis.

Much of the literature has focused on defining eating disorders and its effect on the human body (1,2,3,4). This research seems to concentrate on general health and risk behaviors of collegiate athletes. It is believed that at-risk behaviors make some athletes more susceptible than others to eating disorders. Nattiv et al (1) investigated general risk behaviors in an athletic population. Specifically, this survey illustrated that female athletes in lacrosse demonstrated a significant correlation between amenorrhea and stress fractures. Additionally, a correlation between pathogenic weight control and irregular menses or amenorrhea was found (2). Such research has determined that athletes are more at risk for unhealthy behaviors. This and others investigations report a higher incidence of irregular menses and decreased bone densities in the female athlete (1,3,4,5,6,7). Given the high incidence of such conditions suggests that female athletes still do not completely understand the complexities of the Female Athlete Triad and how it impacts their athletic performances.

Female athletes seem to be informed on some issues regarding eating disorders and its impact on athletic performance but fail to completely understand its overall impact on their health. Athletes may not completely understand that recurring stress fractures may be associated with decreased bone densities (2,4,6,7). Furthermore, female athletes may not understand that decreased bone densities may be associated with decreased estrogen production. Decreased estrogen production has been associated with athletic amenorrhea, energy deficit disorders (not eating enough calories), and low percent body fat (1,3,4).

Female athletes seem to have some knowledge regarding eating disorders, amenorrhea, and osteoporosis. What these athletes fail to understand is how the Female Athlete Triad affects their training or conditioning programs. Perhaps these athletes do understand the relationship but feel a sense of invincibility or sense of control in what they are attempting to accomplish. Coaches, athletic trainers and strength and conditioning specialists are in a position to identify risky behaviors and help educate the athlete in how the Female Athlete Triad may affect athletic performance. ■



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# Where Do Vegetarian Athletes Get Their Protein?

Juan Gonzalez PhD, CSCS and Ashley Eubanks

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Achieving optimum nutrition is something every serious athlete strives for every day. Many people believe that maintaining the appropriate level of nutrition is harder for vegetarian athletes than it is for their omnivorous counterparts. As this article will explain, a vegetarian athlete can be energized well enough to perform maximally with a diet which is diverse and well-rounded.

A vegetarian is one who does not consume meat or any products containing meat. Vegetarians can range from the very strict vegan who, in addition to not eating meat, does not eat any animal products (including dairy, egg, and honey), to the lacto-ovo-vegetarian who will add dairy, egg, and other common animal products to their otherwise non-animal based diet. Vegetarian athletes that include eggs in their diet but not dairy would be classified as ovo-vegetarian. Whereas, vegetarian athletes that include dairy in their diet but not eggs would be classified as lacto-vegetarian.

For most athletes, a high-carbohydrate, low-fat diet is recommended to maintain a healthy body weight and also to promote a high-quality sports performance (2). This is no different for the vegetarian athlete. Constructing meals which meet this general recommendation is not particularly difficult for the vegetarian. For instance, most fresh fruits, vegetables, and grains are by nature high-carb, low-fat foods. It is these foods that are the staple of any proper vegetarian diet. So if finding foods that are high in carbs and low in fats is not a problem, where is it that a vegetarian athlete needs to be more attentive? The answer lies within the amino acid building blocks of the protein. This macronutrient takes a little more consideration and knowledge for vegetarians to ensure appropriate amounts in the daily diet.

Essential amino acids are those that the body is not able to produce, and so must be consumed through the diet. The essential amino acids are: isoleucine, leucine, lysine, methionine, phenylalanine, threonine, tryptophan, and

valine. It is commonly thought that plant-based sources of protein are deficient in one or more of the essential amino acids (termed an incomplete protein). According to some studies, plant-based sources are complete, the issue is that some sources have amounts too low to be considered adequate sources on their own (3). Therefore, a vegetarian needs to become knowledgeable about protein sources. For instance, even though some plant-based sources have reduced amounts of particular amino acids, one can combine foods to fill in these "amino acid gaps." If one food is low in lysine for example, then it should be combined with a food that is high in lysine. Some examples of appropriate combinations are:

- Grains and legumes (beans, peas, and lentils)
- Legumes and seeds (sunflower and sesame)
- Grains and dairy products

Previously, it was believed that complementary proteins needed to be included in the same meal. It has been realized that as long as the foods are consumed in the same day, one will receive the same benefits (3). By including complementary proteins as a part of the daily diet, a vegetarian can be confident that they are obtaining all of the essential amino acids. Research indicates that a diet containing diverse plant foods can provide all essential amino acids (1,3). To make things a little easier on vegetarian athletes, there are a couple of sources which will by themselves offer a complete protein. These sources are egg and soy protein. Egg protein is the most complete source of protein.

Vegetarians may require a slightly higher amount of protein than the Recommended Dietary Allowance (RDA), because some plant-based sources of protein are harder to digest than those from animal sources (1). Whey and soy smoothies are a great addition to the diet of a vegetarian athlete. These easy-to-make drinks are a great source of protein for any athlete, as most offer higher protein content than found in a single serving of other foods. Soy

smoothies would be the choice for vegans as whey protein is derived from a dairy protein.

The American Dietetic Association observes that a vegetarian diet offers high levels of dietary fiber, carotenoids, flavonoids, and various phytochemicals. The ADA also recently announced in 2009, that the typical protein intake of lacto-ovo-vegetarians (and vegans) appears to meet or even exceed requirements. In addition to this, the ADA affirmed that athletes obtaining protein from plant-based diets are able to achieve their protein needs. The American Dietetic Association listed the following as typical benefits of a vegetarian diet:

- Lower blood pressure levels
- Lower blood cholesterol
- Lower risk of hypertension
- Lower risk for Type II diabetes
- Lower BMI (Body Mass Index)

It appears the vegetarian diet has many health benefits. As this article shows, athletes who are following a vegetarian diet can achieve adequate amounts of protein. The well-rounded vegetarian diet is able to successfully energize athletes by providing all the necessary protein requirements in addition to offering a high-carb, low-fat diet. ■

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The graphic features the NSCA logo in the top left corner. The letters 'SSTC' are rendered in large, bold, yellow font. Each letter contains a different athlete in action: the first 'S' shows a football player in a red jersey running with the ball; the 'S' shows a baseball player in a blue jersey swinging a bat; the 'T' shows a soccer player in a red jersey kicking a ball; and the final 'C' shows a soccer player in a red jersey heading a ball. The background is a stylized cityscape with green buildings and a blue sky.

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# Metabolic Rate: How It Plays an Important Role in the Outcome of Your Client's Goals

Dawn Weatherwax-Fall, RD, CSSD, LD, ATC, LAT, CSCS

Each person burns a different amount of calories (energy) each day. It varies on activity, gender, lean tissue, body fat ratios, hormonal and metabolic factors and eating patterns (1,2,3).

Knowing what you burn at rest (Basal Metabolic Rate/ Resting Metabolic Rate, Resting Energy Expenditure) and what you individually burn throughout the day (Total Energy Expenditure) has a significant impact on body composition, energy levels, recovery, nutrient requirements and individual performance goals (4,5,6).

To maximize the goals of your clients, here are reasons why metabolic testing is an important component of the process.

### 1. No guessing/Faster results

Each individual burns calories differently and there are many individual factors besides height, weight, gender and age that effects metabolism. By getting an individual reading, you elevate any guess work and get to your client's goals more quickly.

### 2. Consistent energy

If you are over or underestimating someone's energy needs, blood sugars can dip up or down. Keeping a client's blood sugars level constant has shown to optimize muscle growth and burn fat (4).

### 3. Recovery.

If you are not getting enough calories on a daily basis it is hard for the body to recover optimally. This deficit can lead to a decreased immune system, overtraining, less lean tissue gained or even an increase in body fat (7,8,9).

### 4. Motivates.

Some athletes burn so many calories/energy that knowing exactly what they have to eat every day to reach their goals gives them a number to strive for. Many of these clients fall short time and time again because they did not realize how many calories the body needs to build lean mass.

### 5. Reassurance.

Many clients do not believe they burn that many calories throughout the day and chronically undereat due to fear of getting fat. By having individual numbers, it begins to elevate the fear and gives them permission to eat more.

### 6. Avoiding obstacles.

Being able to detect any issues that may cause a decrease in progress ahead of time, is what makes a specialist a specialist. If a client is burning fewer calories at rest, than is normally seen, it could lead to a conclusion they have been undereating for a period of time. If you overestimate caloric needs, than you put your client at risk of adding unwanted body fat. Each scenario affects speed, power, strength and performance outcomes (10,11).

The easiest way to measure resting metabolic rate is by indirect calorimetry. Exercise physiology labs, sports performance facilities and hospitals have these capabilities. To measure everyday expenditure, and sleeping calories, there are devices that can notate calories burned in a 24-hour period. If none of these options are available, then you can fall back on energy expenditure calculators and/or equations.

## Instructions

### Things you'll need:

- Measuring tape
- Scale
- Calculator

1. Get an accurate measurement of your weight and height.

2. You first have to convert your weight in pounds into weight in kilograms. You do this by dividing your weight in pounds by 2.2.

For a person who is 135 pounds this would be  $135/2.2=61.4$  kilograms

3. Then take your height in inches and convert it to centimeters. A 5'5" person would be 65 inches. Multiply the inches by 2.54.

So the 5'5" person would be  $65 \times 2.54=165$  centimeters (rounded).

4. Here are the formulas to determine expenditure levels. Plug in the kilograms and centimeters where indicated. The resulting number is the number of calories that are necessary to maintain your current body weight with little or no exercise expenditure.

Estimated Daily Resting Energy Expenditure formula for males

Males:  $66 + (13.7 \times \text{kg}) + (5.0 \times \text{cm}) - (6.8 \times \text{years})$

Estimated Daily Resting Energy Expenditure formula for females

Females:  $655 = (9.6 \times \text{kg}) + (1.85 \times \text{cm}) - (4.7 \times \text{years})$

5. Example: For a 215lbs, male who is 6 feet tall and 23 years old, convert the numbers and put into the equation:  $215/2.2 = 97.7$ ,  $72 \times 2.54 = 182.9$

6.  $REE=66 + (13.7 \times 97.7) + (5 \times 182.9) - (4.7 \times 23)$

$REE=66 + 1,338.5 + 914.5 - 108.1 = 2,210.9$

7. According to this formula, for our 215 pound, 6 foot tall, 23 year old male to maintain his current body weight at his current level with little or no exercise, he would have to eat approximately 2,210.9 calories per day.

Metabolic testing at rest, and for the whole day, can be a very effective tool for creating successful results, maximizing recovery, motivation, providing reassurance and individualizing outcomes. ■

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# Caffeine and Athletes

Caffeine may be the most widely used and accepted stimulant in the world. It is found in a variety of plants, dietary sources (including coffee, chocolate, cocoa, and colas), and non-prescription medications. The average caffeine consumption in the USA is approximately 1000 mg. per day. Ingested caffeine is quickly absorbed from the stomach and peaks in the blood in 1 – 2 hours (1).

Evaluating the effects of caffeine on performance is often difficult through research because of the variability of the type of participants tested (sex, training levels, source of caffeine, habituated or caffeine naïve, etc.), exercise protocols (anaerobic exercise bouts or endurance exercise/time to exhaustion trials or time trials versus time to exhaustion), caffeine dosages, and the sensitivity of the cognitive test used (simple RT tests and number recall versus more complex information processing tests) (6).

## Benefits of Caffeine for Performance

Caffeine is considered to be an ergogenic “drug” with beneficial effects on both physical and mental performance with minimal side effects (7). Caffeine is thought to act as a central nervous system stimulant and have effects on cognitive psychomotor functioning, particularly during mental and physical fatigue, by enhancing alertness and vigilance. Caffeine may therefore play a role in all types of exercise in which concentration, reaction times (RT), and technical/tactical skills have a major influence on both physical and mental performance such as cycling, orienteering, Formula 1, and ultra endurance events (6).

Caffeine ingestion (3 – 9mg/kg bw) prior to exercise increases performance during prolonged endurance exercises and short-term intense exercises lasting approximately five minutes in the laboratory (5). This is true for both elite and recreational athletes. Caffeine does not appear to enhance performance during sprints lasting less than 90 seconds, although research in this area is still lacking (5).

The optimal dose of caffeine for maximizing the chance that exercise performance will be enhanced is about 3 – 6 mg/kg, where side effects are minimized and urine levels are legal (1).

## Other Benefits of Caffeine

In addition to the sports performance aspect, caffeine has been shown to positively affect an individual's health in the following areas (4):

- Alertness, mood change
- Alzheimer's and Parkinson's diseases
- Glucose levels and a lower risk of Type 2 diabetes
- Gallstones
- Liver function liver cirrhosis
- Decreasing LDL-cholesterol
- Providing antioxidants
  - Coffee beans and tea both contain phenolic compounds and antioxidant compounds. However, phenolic compounds can be lost during the roasting process. Medium roasted coffee maintains the most antioxidant activity (4).

## Other Concerns

### High Blood Pressure

Contrary to what you might expect, in hypertensive subjects, the prolonged administration of caffeine is not associated with a significant elevation in blood pressure (2,4).

### Dehydration

While athletes often refrain from caffeine use because of its role as a diuretic, caffeine consumption does not result in water-electrolyte imbalances, hyperthermia or reduced exercise-heat tolerance (2).

### Side Effects

The side effects of caffeine ingestion include anxiety, jitters, inability to focus, gastrointestinal unrest, insomnia, irritability, and, with higher doses, the risk of heart arrhythmias and mild hallucinations (1,7).

## Legalities

Effective January 1, 2004, the World Anti-Doping Agency (WADA), in conjunction with the medical commission of the International Olympic Committee, removed caffeine from the list of stimulants prohibited for use by athletes. This may be a reflection of the increased use of caffeine as a stimulant in supplements, sport drinks, and gels. These products, which may be larger and contain more caffeine, may be consumed in quantity by athletes. As noted earlier, caffeine is also found in a wide variety of other food products (7).

As a result of this new regulation, athletes in the Olympics do not need to be concerned with drinking caffeinated beverages and testing positive for the use of caffeine. However, WADA has placed caffeine on its monitoring list, meaning that caffeine levels in athletes are tested, and, if caffeine abuse increases, it may be returned to the prohibited list (8). On the other hand, the acceptable limit in sports, sanctioned by the National Collegiate Athletic Association (NCAA) in the U.S. is 15 ug/ml measured in the urine (1).

A large amount of caffeine can be ingested before reaching the banned limit. The odds of reaching the limit through normal caffeine ingestion are low, except where smaller volumes of coffee with very high caffeine concentrations are consumed (1).

## Bottom Line

1. Be aware of how much caffeine is in your food, drinks, and medicine, including nonprescription drugs. Do not use caffeine as a possible ergogenic aid, for the first time, during a competition.
2. First use caffeine during practice, and not in a competition.
3. Listen to your body. If you have any unwanted side effects, limit your intake.
4. Caffeine withdrawal can cause mood shifts, headaches, nausea, tremors, and fatigue (7). ■

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*We are always looking for new ideas on topics for the MindGames Column. Please submit any topic ideas to [mindgamescolumn@nsca-lift.org](mailto:mindgamescolumn@nsca-lift.org).*

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# Eating for Your Health: Tips to Reduce Your Risk of Disease

Many Americans fail to consume an optimal diet and poor nutrition (or a lack of proper nutrition) is a major factor that can lead to being overweight or obese. For athletes or active individuals, consuming certain foods may affect one's sports performance and may negatively affect one's health. The purpose of this column is to highlight recent studies that address the negative consequences associated with consuming certain foods and drinks.

## Caffeine

We have witnessed an explosion in "energy drinks" during the past several years. These drinks offer caffeine levels as high as 200 – 300 milligrams per serving. But can caffeine improve sports performance? That answer is, yes. There is evidence that caffeine may be useful as an ergogenic aid in some sports (1,2). However, there are potential side effects to consuming too much caffeine that may be detrimental to sports performance and one's overall health. For example, consumption of caffeine can negatively affect one's sleep and disturb the circadian sleep cycle (3). Consuming caffeine, in the form of a "diet" soda, which many think is a healthier option than the non-diet versions, may be worse than previously thought.

## A Link Between Fatty Foods and Depression

Fast food restaurants are everywhere. These well-known establishments offer a variety of meals at an affordable price. There is now evidence suggesting that one who eats a diet high in fatty, processed foods may be at risk of negatively impacting one's mental health. Researchers at the University College London found that individuals who have a diet high in these types of foods have a 58% higher risk of depression than individuals who consumed a diet consisting of whole foods (i.e., fish, fruits, and vegetables) (4).

## Red Meat and Processed Foods Increase Risks of Certain Cancers

For those who desire an increase in their muscular size, the consumption of protein is critical. Eating certain sources of protein (i.e., red meat and processed meats) may increase one's risk of certain cancers. Red meat and processed meats/foods have been identified as potential risk factors for colorectal, pancreatic, kidney, and esophageal cancers (5,6,7).

## Recommendations

Consuming a healthy diet is necessary not only for sports performance, but also for one's overall health. If you are a healthy individual, you should either consult with your personal strength and conditioning specialist or review the government's MyPyramid website (<http://www.mypyramid.gov/>) to identify any deficiencies in your diet. If you receive treatment for a chronic disease, you should consult with your primary healthcare provider for appropriate food choices to help meet your health and fitness goals. ■



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# Keep the Fire Burning

Ah, winter is finally here. And with it (at least in most parts of the country) comes colder temperatures, snow, sleet, fires in the fireplace and fewer daylight hours. If, like most people, you workout before or after work (or school), you are getting bundled up in winter gear to hit the streets or go to the gym when it is dark and cold. Such conditions can challenge even the most highly motivated athlete.

Motivation—you know what that means, right? Athletes often use terms such as “drive,” “desire,” or “going after something with intensity” to describe or define motivation and motivated behavior. While we often think that motivation comes entirely from within the individual, it is important to recognize that motivation is actually a function of both the individual (you) and the situation. So, to enhance your motivation, you will want to not only address the ‘you’ part of the equation (i.e., what motivates you? why do you exercise/ compete/ train? what can you do differently) but also look at situational factors such as your coach, training partner or the facility where you train, as these can play a role in your motivation as well.

Now, let us take a look at some strategies to “keep the fire burning” during the winter months.

## Goals, Goals, Goals

At times, athletes are found to consistently workout but do not really see any results. That is, they train day-in and day-out but tend to just go through the motions. In such situations, it is tough to stay motivated as the athlete has no ‘destination’ in mind. To use a driving analogy, the athlete is driving aimlessly—getting in the car everyday but just meandering about with no purpose or objective. Contrast that with the driver who has a clear goal (i.e., getting to New York) and a roadmap to get him there. He is focused and purposeful as he gets behind the wheel. He knows where he wants to go, how he is going to get there, and when he wants to arrive, which makes for motivated driving, right? Similarly, the athlete who has a clear goal is going to be more purposeful and motivated to get the job done as he has a clear reason behind what he is doing in the gym, on the roads, or on the court each and every day.

So, to keep your fire burning, identify daily training goals that tell you where you are going and how you are going to get there.

## Reinforcement Works—Use it

A swim club I visited years ago kept an attendance chart for their younger aged swimmers. For each practice session attended, an athlete received a sticker. After two weeks of practice, if she had eight stickers she got a reward. Similar tactics are used by parents and teachers to encourage appropriate behavior. The reward for “good behavior” serves as a motivation to the youngster. Why not use this reward strategy for yourself? If you struggle getting out of bed when it is dark, do not like working out in the snow, or find it easy to skip a day since the next competition is not for months, identify a reward that will provide you with the necessary motivation (i.e., going to see your favorite movie after five quality training sessions, going out to dinner, etc.). Be very specific. Commit to paper what you need to do, how often you need to do it and do not sell yourself short. If you achieve your goal, treat yourself with a meaningful reward. If you do not reach your goal, don’t say “I was close. I’ll reward myself anyway.” Withhold the reward and try harder the next week.

## Look Around You

What about the environment? Are there things in the environment that can be changed to enhance your motivation? It may be that simple changes can be made that can have a positive influence on your motivation. Some examples to get you thinking:

For those that have a workout room in their home, maybe putting posters on the wall, changing the music you listen to or adding mirrors can influence your motivation.

Do you train alone? It may be that running, swimming or lifting with a training partner can bring a positive change to your motivation.

If you have a training partner, let her know things she can do and say to enhance your motivation. Ask the same of her.

What about something as simple as putting together a CD with songs that will motivate and get you energized as you drive to the gym?

Write your long-term goals on a piece of paper and tape it where you will see it prior to a workout or training session—in your bathroom, on the refrigerator, in your car—to serve as a reminder of why you do what you do.

Do the “little things” in order to succeed in achieving your goals. If you know you have an early morning workout, do not stay up late if you

can help it. Lay out your workout clothes the night before. Put the coffee pot on auto-brew so the aroma of a freshly brewed pot will entice you from the bed.

Share your goals with your family and friends. Allow them to hold you accountable and do not get mad when they challenge you as to why you didn't work out today like you said you would. Take that energy and use it as motivation for the next time you consider blowing off a workout.

We have all experienced those days where the last thing we want to do is get out there and put in the effort to have a good training session. But we have also all experienced the positive feelings that come with completing the workout

once it's done. And most of us have also shared moments where we have been able to do something spectacular in a training session we were prepared to just blow off. There are many things you can do to enhance your motivation. Take control of yourself and the environment and give yourself the best chance for success. ■

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