

EN ENDURANCE NEWS #25

SCREENING FOR PROSTATE CANCER

by Gilbert Preston, MD

The issue of screening for prostate cancer is at this moment a hotly debated one in medicine, and I am not going to solve the issue with this article, simply because I am not a urologist, and primarily because the data are incomplete.

The issue is whether or not measuring a protein normally produced by the prostate gland, but significantly elevated in cancerous prostates-PSA a) saves lives and b) is worth the risk of side effects such as incontinence, and/or impotence? Since prostate cancer is a disease of "elderly" males, and is generally "slow" growing, and whose course to fatality may take longer than the "naturally" remaining lifespan of the patient, one school of thought holds that no screening, and a watch and wait approach to discovered cancers is the least risky and most "cost effective" (Ask yourself-to whom is it most cost effective? - Answer, "the health care system" -i.e.-third party payers).

The core problem is that the course of any given cancer patient is not precisely predictable, "longevity" is a statistical guess, virtually inapplicable to the individual patient (unless he has a rapidly fatal comorbid condition (advanced alzheimer's, heart failure, renal failure, another endstage malignancy, pulmonary or hepatic failure, etc.), and prostate cancer screening has not been in use long enough to have engendered completely reliable information.

This situation mimics closely the early thoughts about mammography screening for women. For many years it appeared, and still does to some researchers, that

finding early breast cancers and removing them would not reduce the death rate from breast cancer (the # of women per 100,000 population who die each year from breast cancer), but that it would simply delay the deaths (it generally takes longer to die from a small cancer than it does from a "big" one) so that there would appear to be fewer per time period. The clinical common sense view was that removing a cancer before it spread was usually the equivalent of a cure, the hang-up being that some cancers seemed to undergo microscopic spread at a time before they could be detected by any available means.

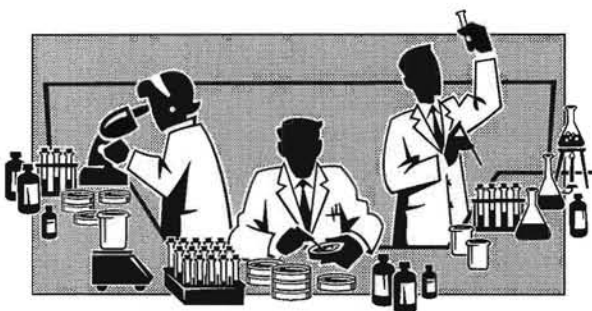
Lately, however, after some 20-25 years of routine mammography and other means of breast cancer screening, it does appear that a real decline in breast cancer deaths is beginning to be reported in the literature.

As a result, all responsible medical authorities support routine breast cancer screening exams, and prompt breast tumor removal in women.

Since prostate screening was initiated about ten years ago, what appears to be true is that prostate cancers are being discovered at a much smaller size, and earlier stage than they were say 20 years ago. Back then, it was most commonly the case that these cancers were discovered most often when they had already spread beyond the anatomical confines of the prostate gland.

Will this earlier "pickup" result in prostate cancer death rate being lowered? Maybe. (My guess is yes, but I am a therapeutic

(continued on page 8)



MUSCLE CRAMPS: ORIGINS & RESOLUTION

by Dr. Bill Misner, Ph.D.

INTRODUCTION

If you have faced the occasional problem of muscle cramps during a variety of conditions you planned for and prepared to avoid, you well-know that the causes of muscle cramps from related endurance exercise can be puzzling indeed! The three reviews below are from literally hundreds of studies that have attempted to isolate and name the origin of this unwanted, usually unexpected physiological phenomenon. If you have problems with exercise induced muscle cramping, it may be related to fitness level, acclimatization, rate of exercise intensity or duration, diet, viral or bacterial microorganisms, fatigue from lack of rest or sleep, weather changes, humidity, pre-event or during-event carbohydrate, electrolyte, fluid balance-intake. And there may be a few other factors not mentioned here also...

Muscle cramps have a multiple etiology. Clinically, "Exercise-Associated-Muscle-Cramps [EAMC] have four separate theoretical causes. Athletes using non-sugared fluid energy drinks experience remarkable, indefinite cramp-free aerobic exercise [70-85% VO2 Max] when the following criteria are met:

1. Total fluid intake rate 16-24 ounces per hour.
2. "Endurolyte" intake rate from 2-6 capsules per hour.
3. Caloric intake of 85%-95% complex carbohydrates, 5-15% protein, totaling between 300-400 calories per hour.

Literally 100's of reports, documented in our files, show the typical endurance athlete who experiences severe performance debilitating muscle cramps, drinks 25+

(continued on page 9)

FREE SHIPPING!

This article is formal notice of our Win/Win referral program for all existing customers, like you. The way it works is very simple. If you share the good news about any E-CAPS or Hammer Nutrition products with your training buddies or competitors from different age groups/categories (after all, we don't expect you to be giving up your secret edge to your rivals), which prompts them to place an order with us, you can receive free shipping on your next order. We will also give the new customer free shipping on their first order too!

The only catch, and it's not really even a catch, is that the new customer must mention your name when they call to place their order so that we will know who to credit the referral to. It should be easy to get them to give us your name since you're going to tell them that they'll get free shipping if they mention your name when they call. The only other limitation is that the free shipping only goes up to \$10 dollars. So, if you or the new customer places a huge order for Hammer Gel, Sustained Energy or something else that is quite heavy, the first \$10 will be covered and you or they would just be charged the extra couple of bucks over the first \$10. We'll be happy to supply you with extra Hammer Gel and E-CAPS brochures to make it easier for you to get your friends on the program.

The best part of this is that there is no limit to the number of customers you can refer. If you refer 20 customers, you'll have free shipping, up to \$10, on your next 20 orders.

In case you were wondering, we cannot make this retroactive. If you referred someone a few weeks or months ago, but they didn't mention your name when they called, that's just water under the bridge. ■



Customer service is our top priority. This statement is often spoken by businesses, but isn't always practiced in reality. For me this truly is my first concern. I've said it before and I instruct all of my employees that I want all of my customers to be treated the exact same way that I would like to be treated when I do business with a company; with courtesy, efficiency, and fairness.

Most of the time, we do a very good job on following through in our efforts to maintain A-1 quality customer service. But occasionally we come up a little short. So, the first order of business is to apologize to any of you who were not completely satisfied with the service you received in a transaction with E-CAPS/Hammer Nutrition. The second and most important issue is that you are welcome to bring any such situation to my attention any time. I want to know if any of my staff is deficient in any way in dealing with you. So, please do not remain silently dissatisfied. ■

MIX HAMMER GEL IN WATER

Did you know that you can mix Hammer Gel right into your water bottle just like you would any powdered energy drink mix? Yes, it's true, if you don't want to use the flask and drink plain water for whatever reason, you have another option. In fact, the hammer gel actually mixed up faster and easier than many powders.

To duplicate the 70-100 calories that you get out of a typical serving of Cytomax or some other sugary powdered drink mix, you need to put only 1 serving of hammer gel in your water bottle. However, you can add several more depending on how long you will be exercising and how strong you want the flavor to be. Experiment with different quantities and find the flavor and number of servings that best suits you. ■



SUSTAINED ENERGY WARNING

Unfortunately a couple of customers have found out the hard way that it is not a good idea to mix up large quantities, several bottles or gallons, of Sustained Energy for use over the course of a couple or several days. So, if you were thinking of doing this, forget the idea. The problem arises due to the fact that the protein in the formula in combination with the carbs and water, and the life forms it usually contains, creates a perfect feeding and breeding environment for little creatures when heated to temperatures over 90 degrees.

We would suggest that for multi day situations that you pack the Sustained Energy in plastic bags in the desired amount (3,6,9 or more scoops) and carry or pick up your water separately and mix the solution as needed.

In the case of Ironman races where you would want to place pre-mixed bottles in a need back that must be dropped off the night before the race, use distilled water instead of tap or bottled water. By using distilled water, you can avoid having the Sustained Energy solution from "turning" sour for at least 24 hours and probably even 48 hours. ■

HAMMER GEL UPDATE

Originally, the Hammer Gel Update wasn't meant to be a regular feature in *Endurance News*, but it seems to be turning out that way. So, without any further hesitation, here is the latest on the gel you all know and love so well.

TOO THICK VANILLA: Some of you may have received jugs of vanilla over the past couple of months that were a little thicker than normal. This was limited to one production run and has been corrected for all future orders.

TOO THIN CHOCOLATE: Others may have gotten some really runny chocolate Hammer Gel. This too was a production foible, which has been corrected. After having so much trouble with the chocolate being too thick, we were a little too careful to avoid that problem and ended up taking it too far in the other direction.

I apologize if the inconsistent consistency of either of these flavors caused you any inconvenience. We will continue to strive for uniformity in the taste and viscosity of

all 7 flavors so that it won't be hit and miss each time you order.

In the next year or so, we will be adding new flavors to the 7 we currently offer. Some of the leading candidates are wild cherry, mango, and pineapple. If you'd like to cast your vote for one of these or suggest another, we'd love to hear your input. Drop us a line or mention it next time you order.

Just a reminder to any of you who might not have received a copy of the last issue

(#24), as of June 1st, the single jug price of Hammer Gel increased to \$14. If you buy 3 or more, the price is still \$12 each.

Lastly, we had many people who called or mailed in info on their favorite bike shop or running store that they would like to see stocking the Hammer Gel. We have sent all of the retailer's information and are following up to see if they want to start carrying it. Unfortunately, so far none of them have expressed any interest in carrying Hammer Gel. ■

HAMMER GEL



AFTER HOURS ANSWERING SERVICE

As many of you who have dealt with our after hours answering service know, they leave a lot

to be desired. It pains me greatly to know that between 5PM and 9AM you are being subjected to erratic and sometimes downright terrible, even rude, customer service. So, to begin with, I'd like to offer my sincere apologies to any of you who have had a bad experience with the answering service. Secondly, I'd like your input on whether we should continue using the answering service or go to an auto attendant phone system for after hours calls.

I'm hesitant to pursue this alternative because of how much it annoys me to deal

with endless menu options on a phone system. Until now, we have felt that customers would prefer to speak to a live person instead of following a maze of "press 1 to place an order, press 2 if you have questions about an order you recently received, etc." However, with the frequency of problems and complaints we have with the answering service, I'm beginning to doubt this. In case you are wondering, there is no other live answering service in the area which we are located.

So, we are asking you to cast your vote in favor of 1) keeping the existing after hours answering service, or 2) go to an auto attendant phone system. We value your opinion immensely, so please do let us know by phone (800) 336-1977 or e-mail; ecaps@e-caps.com. ■

E-CAPS KIT PRICES INCREASE SLIGHTLY



After holding prices down on the Cardio and Enduro Caps kits for a decade, yes 10 years, and absorbing ever-increasing transportation and raw materials costs, we have had to make a few adjustments. Sometimes, as in the case of Creatine Boost, prices actually decrease. In other instances, as with the Tissue Rejuvenator, you may receive a vastly improved and higher potency formula for the same price. The point is that we don't just raise prices arbitrarily every year or even every 3-4 years. But, sometimes it does become necessary to do so.

With that in mind, you should be aware that effective 6/1/99, 1 month supplies of Cardio & Enduro Caps have increased from \$34.95 to \$37.95. 3-month supplies of the same products have increased from \$89.95 to \$99.95. The 3-month kit with Xobaline increased by \$5 to \$124.95. Lastly, we should remind you that substituting liquid Xobaline in place of the capsules is an additional \$5 on Major and Rapid Improvement kits and \$10 on 3 month supplies of Cardio or Race and Enduro Caps.

However, the three-month kit prices have stayed the same for those of you who are on our "continuity" automatic shipping program. That also means that you can effectively avoid the cost increase by joining our automatic quarterly shipping program. Another benefit of joining the program is that you get free shipping, a \$5.95 value, if we bill you for the entire amount with each quarterly shipment. The added bonus of joining our automatic shipping program is that you get free swag like a T-shirt, or socks and a water bottle with your second shipment.

If you have any questions about the price increases or getting signed up for automatic shipping, just give us a call at 1.800.336.1977. ■



In the last issue of *Endurance News* we announced our brand new line of premium quality, hip logo apparel that includes new design and color schemes for our t-shirts, hammer logo DeFeet socks (\$4!), specialized water bottles (\$2!), DuPont CoolMax singlets, cool T's, trail shirts (\$13!) and hats (\$9!).

The t-shirts are the highest quality, 6 oz. 100% cotton and pigment died to produce rich, permanent colors that will last for years. With colors like pomegranate red, mustard yellow, and yam orange, you will be a style leader wherever you go. If you wear baseball style caps for leisure or training, you have to have one of the new Hammer Nutrition hats for your collection. I went to great lengths to find a top quality cap that is still made in the USA. We managed to do even better by finding a company in Great Falls, Montana that is still in business. The 6 panel hats (these are the cool ones, not truck driver style) come in three colors; tan, olive and a stone washed, faded green. Our cool hammer crank is embroidered in a variety of contrasting color combinations that include, black/red, purple/red and purple/black on the front and "Hammer Nutrition" is embroidered on the back in a semi circle pattern. Because of the quality, US manufacturing and embroidering, our cost on these caps is \$9 per unit, which is exactly how much we are selling them for.

So, next time you order, pick up some high quality, low dollar soft goods. ■

THE ULTIMATE FUEL/ELECTROLYTE COMBINATION

If you train and compete in events that last for more than two (2) hours, we'd like to suggest that you consider using a combination of Sustained Energy, Hammer Gel & Endurolytes. That is, if you are not already doing so. Over the past couple of years, this fuel/electrolyte has proven to be quite effective for ultra applications ranging from half and ironman distance triathlons to 100 mile trail races like Western State to RAAM to Eco-Challenge.

If you follow some simple guidelines, you too can overcome all of the typical fuel-energy problems that athletes encounter too often in races such as these. The scenario is to average approximately 3 scoops of Sustained Energy (1 serving equaling 334 kcal, 73 grams carbs, 10.5 grams protein), 1-2 servings of Hammer Gel (1 serving is 100 kcal, 24 grams carbs), 2-4 Endurolytes and a maximum of 24 fluid ounces of water. The number of Endurolytes that you take each hour is determined by the extent of heat stress that you are encountering.

How you combine this mixture is going to depend entirely on your personal preferences and logistical concerns. Here are 3 scenarios that you can consider. Through experimentation, you may find one of these to be ideal or another one that works better for you.

SCENARIO #1: Mix 3 scoops of Sus-

tained Energy, 2 servings of Hammer Gel with pure water in a large water bottle. Consume the entire contents each hour along with 2-4 Endurolytes.

SCENARIO #2: Mix 6 scoops in a small or large water bottle with pure water. Fill another small or large water bottle with plain water. Consume the contents of both bottles gradually over 2 hours, taking occasional shots of Hammer Gel and 2-8 Endurolytes as needed.

SCENARIO #3: Mix 9 scoops of Sustained Energy in a large water bottle. Drink this gradually over 3 hours along with 2 small water bottles of plain water. Take Hammer Gel from the flask as needed, but probably using between 1/2 and a full flask over the 3 hours.

Any of these combinations will meet all of your caloric and electrolyte needs for an almost indefinite period of exercise. Additional calories can be ingested from solid foods as desired. However, when eating solid foods, avoid all candy, cookies and energy bars that are full of sugar. Instead eat real food like baked potatoes, sandwiches, soups, bagels, pretzels, crackers and fresh fruit.

So, if you have ever had stomach and or GI problems during long races, or even if you haven't but would just like to find something that works better than what you've been doing, this is the hot ticket! ■

JAZZ UP SUSTAINED ENERGY WITH HAMMER GEL



Many customers have asked whether or not Sustained Energy and Hammer Gel are compatible. The answer is an emphatic yes. In fact, one of the best

ways to liven up the taste of the Sustained Energy is to mix a couple of servings of Hammer Gel into the solution.

However, please be aware that it is not a

good idea to mix, either in the same bottle or in your stomach, Sustained Energy with any other energy gel or drink that contains fructose or other refined simple sugars. But, the 100% complex carbohydrate profile of the Hammer Gel will mesh perfectly with the 85% complex carb, 15% protein profile of the Sustained Energy.

So, the bottom line is that you can and should use Hammer Gel in conjunction with Sustained Energy. For more on this, see the article on page 2. ■

WHAT TYPE OF TRAINING SHOULD YOU DO NOW? by Nate Llerandi

By now, you probably have at least a couple of races under your belt. If you're like most endurance athletes, you're probably scratching your head and wondering how you're going to bring everything together for your big races at the end of the summer or early fall. You can look at your early races for clues as to what type of training you need to focus on to maximize your successes as the season progresses.

If you are able to produce a lot of power and can hold an intense effort for several minutes, but tend to peter out in the latter stages of a race, then more Anaerobic Threshold (AT) training is what you probably need to incorporate. On the bike, I have found that starting out with 2 sets of 15:00 at 84-92% of max HR, with 10:00 of easy spinning between hard efforts, is a great way to start boosting your AT. Progress to 2 sets of 20:00 with 15:00 of easy spinning between and, even as much as 2 sets of 25:00 if you can handle the 20:00 repeats. For running, start out with 4-6 x (1200 @ 84-92% with 400 easy jog). Then work up to 3-5 x 1600m, also with 400 easy jogs. Finally, work up to 2400m repeats with 800m easy jogs. For swimming, begin with 300 meter or yard repeats with :30-:45 rest. Work up to 8 repeats where you can hold your effort even, or even descend your times as the set progresses. You can decrease your repeats and increase the distance up to 500. If you do that, you can take :45-1:00 rest between repeats.

If sustaining a given pace for a long time is not a problem for you, but you just aren't going as fast as you would like to, then you probably need work on increasing your power. To accomplish this on the bike, I recommend starting out with 6 sets of the following: (3:00 @ 90-95% - 2:00 easy spinning), with an extra 10:00 easy spinning after the third set. Work up to 6 sets of (6:00 hard - 2:00 easy). For running, shorter repeats do the trick. A couple of different sets are as follows. You can complete 8-12 sets of (200 fast - 200 easy jog). Run the fast 200s

as fast as you can

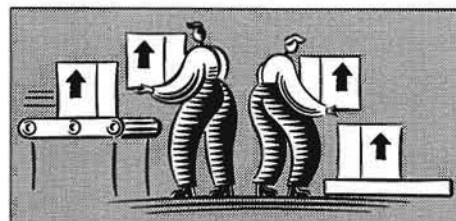
while maintaining an even pace. Take no more than 1:00 rest between hard repeats. You can also do 4-6 x (800 fast - 400 easy jog). Your HR should be in the 90-95% range, and the goal should be to hold your times even. For swimming, two potent sets come to mind. Start out with 24 x 50, alternating 50 fast - 50 easy. Do these on an interval that allows about 10 seconds rest on the easy 50s, but no more. You can work up to as many as 40 x 50. Another set is 6-8 x 100 or 150. Do these as hard as you can and rest for double the amount of time you swim hard. I recommend swimming easy for at least part of the recovery interval.

If other endurance sports are your preference, you can adopt any of the guidelines above to those sports, like in-line skating or rowing.

All of this progression should be over an 8-week period, consisting of two blocks of 3 hard weeks and one recovery week. During the hard weeks, do these workouts once or twice per week. Twice is better, but only if time allows. Do not force your weekly routine. It's better to do less and be relaxed than get stressed out as you try to fit in as much as you can. During the recovery week, cut the workload in half and build into the hard repeats. The overall effort should be much less than during the hard weeks.

There you have it. After eight weeks of concentrating on one type of workout, switch your focus to the other type. They compliment each other very well. If you can develop both energy systems so that neither is a weakness, you will be racing stronger and faster than ever. As always, happy training!! ■

Nate Llerandi is a former professional triathlete who lives in Colorado with his wife and daughter. Besides being a father and working full time, he authors articles such as this, contributes frequently to our Endurance On-Line Group and provides tailor made coaching services for athletes. You can reach him in care of Endurance News.



SHIPPING UPDATES

Update #1: FedEx recently announced that they are abandoning their policy of "dropping and dashing" 3 day Express Saver packages on the first delivery attempt. They will now require a signature before releasing the package. If no one is home on the first attempt, they will leave a hang tag on your door to notify you that a delivery attempt was made. You can sign the hang tag giving them permission to leave the package at the door the following business day. They will make a total of 3 delivery attempts before returning the package to us.

The back of the hang tag also has a permanent signature release form that you may complete so that they can leave packages at your door on the first attempt of all future deliveries. However, please keep in mind that once you sign the one time or permanent release forms, you will be assuming responsibility for any package that is released at your address.

Update #2: By the time you read this, we will have daily UPS service in addition to FedEx and U.S. Postal Service. So, if you have a distinct preference for UPS, just let us know and your package will be sent out UPS 3 day select instead of FedEx 3 day express saver. There will be no difference in price. If you state no preference as to the carrier that you prefer, we will select the best option based on your geographical location and minimum time in transit.

Update #3: Regardless of which carrier you prefer or we select for you, it is always better to have us ship to an address where there is likely to be someone there to receive the package. If for example, you'd like to receive packages at your work address and newsletters and other mail at your home address, we can split your ship and mail address to accommodate you. If you would like to do a split ship/mail address or change your combined address just let us know next time you order. ■

SHOULD SUPPLEMENTS BE REFRIGERATED?

by Mr. Christopher Myers & Rear Admiral Joyce Johnson, US Coast Guard

Retrogradation from time-exposure occurs in most combine amino acid-carbohydrate macronutrients, water-soluble micronutrients, enzymes, coenzymes, and to some degree fat-soluble supplements when exposed light, heat, and humidity. While nitrogen treating and hermetic sealing enhances substrate freshness lengthening shelf life, once the supplement or food is opened, the second law of operant thermodynamics or spoilage may be observed. What then is the best way to store supplements to maintain their potency? Wanting to know more about retrogradation and shelf life, I contacted the "experts" from Highland Labs, Universal Manufacturing, and Humitrol for their informative confirmation research on supplement and food refrigeration.

HUMIDITY LEVELS INSIDE A REFRIGERATOR ARE LOWER THAN OUTSIDE

The darker, dryer (less humid), colder temperatures favor freshness, potency, and enhanced shelf life for supplements and food sourced nutrients. To confirm this, hygrometer measurements were performed to determine both refrigerator humidity and temperature compared to outside air during a 24 hour period in Spokane, Washington. The average temperature measured outside the refrigerator was 69.75 degrees with an average humidity of 44.25%. Inside the refrigerator the average temperature and humidity was taken on the lowest shelf, averaging 35.25 degrees with a significantly less humidity of 32% during the same time period. The less-light, colder, less-humid environment from a refrigerator is superior for maintaining food and supplement potency. Here in the Pacific Northwest our climate is less humid than the east, Midwest, and southern sections of the USA, emphasizing the need to refrigerate perishable items from exposure to heat or high humidity.

THE RATIONALE FOR REFRIGERATION

Mr. Christopher Myers, President of Humitrol, authored the rationale generally accepted from refrigera-

tion engineer science specifically for this question:

1. "Humidity levels fluctuate within coolers constantly. Comparatively, humidity levels are higher outside the refrigerator than inside. This is due to the desiccating affect that the refrigeration process has on the confined environment. An example of this, say the relative humidity outside the refer is 85%. Once the refer door is opened, a vacuum draws the outside air into the cooler, increasing humidity levels within the cooler to 85%. Once the refer door is closed, the evaporator works to remove trapped heat energy from the moisture laden air. Through the process of evaporation, comes desiccation, and its counterpart condensation. As the moisture and heat are removed from the air, heat is expelled from the system, and the moisture, collects on the surrounding surfaces in the form of condensation. The net affect of this process is relative humidity levels rise, peak then fall in a continuing cycle as the refer is used. If the cooler door were to remain closed for longer periods of time, the evaporator would desiccate the environment to humidity levels far lower than that of the air outside the cooler. This occurs at night when the cooler is not used for a period of 8 to 12 hours. —

REFRIGERATION OF SUPPLEMENTS RECOMMENDED

2. I would recommend the refrigerated storage of supplements for two reasons. The first, if the supplement is in a liquid form refrigeration will reduce the risk of heat damage, and assuming that liquid supplements are perishable, refrigeration would extend the safe shelf life and quality of the product. The second reason, in a refrigerated environment, humidity levels can be regulated and monitored easily. The fact being, a cool dryer environment seems better for the storage of tablets, pills, or capsules. Similar to the reason desiccation packets are included in pill containers. If the product were produce, the inverse would apply. Higher humidity levels would be

required in the refer to maintain quality." (Christopher Myers, President /Humitrol, Inc. www.humitrol.com)

FOOD RETROGRADATION OUTSIDE REFRIGERATION

In 1998, unsafe humidity levels may have caused:

1. 2,000,000 cases of food born illness.
2. 9,500 deaths from food born illness.
3. \$4,000,000,000 in spoilage losses.

Preservation of food products is not only of economic importance, it is an issue of public health. The FDA estimates that annually some 40-80 million people become ill and 11 thousand die in the United States as a result of something they ate. Medical expenses to treat these cases are estimated at 80 billion. The cost to a food service company is between \$1,500 and \$ 78,000 to defend and settle a food borne illness claim. Food products are all subject to deterioration by microorganisms.

Microorganisms are so minute that they cannot be seen with the naked eye. Uneducated food service personnel generally do not consider their existence. Pathogens are disease causing microorganisms. Within hours, under optimum conditions of elevated temperatures and high moisture levels, these organisms exponentially replicate themselves into the millions on the surface of and within food products. A single cell can replicate itself into the millions in 10-12 hours. The average temperature range for the growth of most microorganisms of public health significance is between 45° to 130° F. It is generally acknowledged in the food service industry that food should not be held in this danger zone for more than four hours. Illness can result through infection, which is consumption of the microorganism, or intoxication, which is the consumption of the poisonous metabolic waste (exotoxins) produced and excreted by microorganism into its environment, the food product.

(continued on page 10)



CAFFEINE CONTROVERSY



by Dr. Bill Misner, Ph.D.

INTRODUCTION

I have personally debated with several other Ph.D.'s on the subject of stimulant-use in sport, specifically the use of fatty acid mobilization from Caffeine or the practice of Caffeine-Ephedra-Aspirin "CAE-Stacking" by both strength athletes and endurance athletes.

Due to the neuro endocrine response harm and how the body bio chemically adapts, CAE stacking for fat-loss "cutting" by weight lifters and body builders...or, for performance enhancement by endurance athletes, I have concluded that the harm outweighs the good. Caffeine produces those results only in athletes who did not previously use caffeine in their diets. When caffeine was supplemented in athletes who regularly consume caffeinated substances, the results for enhanced performance were distinctly absent.

Caffeine significantly raises the body's mobilization of fatty acids, meaning the blood triglycerides are elevated with each dose. Some of us are concerned about raising blood triglycerides since cardiovascular function may be in peril with prolonged or high dose.

The effect of caffeine peaks 3 hours after ingestion when perhaps we "Feel" it the least, and perhaps then it is harmful to the endocrine and metabolic normal functions. The fact that it dehydrates athletes may cancel the stimulatory value, and certainly the raising of metabolism will increase the rate of the ergogenic substrates you hope will be there (but won't) 3-5 hours into your long run or ride.

CAE-Stacking will enhance the rate of fat metabolism, which is why some sport scientists and coaches advise athletes of so-

called "fat-burning" advantages of the CAE-Dosage based on an older study, advising us of CAE safety and specific merits for ergogenic advantage. CAE-Stacking or Caffeine use is counter-productive to both performance and eventually your health.

What does research indicate?

THE EFFECTS OF CAFFEINE ON THE MAXIMAL ACCUMULATED OXYGEN DEFICIT AND SHORT-TERM RUNNING PERFORMANCE.

A study evaluated the effects of acute caffeine ingestion on the Maximal-Accumulated-Oxygen-Deficit (MAOD) and short-term running performance.

Nine well-trained males performed a preliminary assessment and, at least 4 days later, a supra maximal run to exhaustion. Their VO₂max values were determined, and the MAOD test at an exercise intensity equivalent to 125% VO₂-max was performed. Caffeine (5 mg per kg.) or placebo was administered 1 hr prior to the MAOD in a double-blind, randomized crossover study.

In comparison to the placebo condition, subjects in the caffeine condition developed a significantly greater MAOD and increased their run time to exhaustion.

Caffeine ingestion can be an effective ergogenic aid for short-term, supramaximal running performance and can increase MAOD. [Int J Sport Nutr Journal; 1998; 8: 95-104.]

COMMENT: Note this 300-400 mg. representative of the caffeine quantity derived from 3-4 cups of coffee may be an appropriate ergogenic for short duration performance, while enhancing prolonged endurance may not be as effectual. Avoid Caffeine prior to and during racing endurance events over 90 minutes duration.

Athletes in other studies whose lifestyle indicates any dietary caffeine ingestion DO NOT improve performance from caffeine intake prior to an endurance event. The only athletes whose performances may be enhanced were those who used NO caffeine prior to the exercise event. Researcher Astrid Nehlig of the French National Health and Medical Research Institute in Strasbourg, France, says her study involving laboratory animals showed the area of the brain responsible for addiction is not affected by normal caffeine consumption. In her animal tests, Nehlig found caffeine's effects are different from am-

phetamines, cocaine, morphine and nicotine. The average consumption of 3 cups of coffee a day is too low of a dose, says Nehlig, who adds that consumers would have to drink seven or more cups of coffee in rapid succession to begin to activate this area of the brain.

"Activation of the circuitry of addiction and reward occurs only at high doses of caffeine, which probably induce already adverse effects," such as depression, anxiety and nervousness, Nehlig says. The study was reviewed by OnHealth [3-22-1999].

CAFFEINE RAISES STRESS MARKERS AND HEART RISKS

A few cups of coffee a day provide a jumpstart that's best avoided by adults with even borderline hypertension or a family history of heart disease, a study concludes.

Caffeine acts in the body like a pill that simulates Type A behavior, "exaggerating physical responses to everyday stress," says James Lane of Duke University Medical School in Durham, N.C. Lane asked 72 men and women who typically drank about four cups of brewed coffee a day to wear blood pressure monitors for three days.

Urine specimens to check stress hormone secretions were collected three times a day. As participants followed their normal schedules, they recorded in diaries how stressed they felt at varied times.

The first day provided base blood pressure and stress hormone readings. Everyone agreed to drink no coffee for the next two days. On the second day, half took caffeine capsules at 8 a.m. and noon, the equivalent of four cups of coffee. The other participants were given pills with no caffeine.

On the third day, those who got caffeine the day before took dummy pills, and the others got real caffeine in their tablets. Levels of the stress hormone epinephrine (adrenaline) were 30% higher on days when people took the pills with caffeine, Lane says. Blood pressure increases averaged 2 to 3 points for both systolic (the top number) and diastolic readings.

That rise may seem modest, but long-term studies show that even a 5-point increase in diastolic pressure boosts the risk of stroke by 34% and of heart attack by 21%, he says. Also, blood pressure stayed higher until 10 p.m., even though the last caffeine dose was taken 10 hours earlier. And people

(continued on page 11)

EXERCISE MACHINES & CALORIC EXPENDITURE*

by Dr. Marty Hoffman, MD

When you consider the statistical results, we found no difference among the stair stepper, rowing machine and cross-country skiing simulator; and no difference between the Airdyne and bike ergometer:

1. treadmill
2. stair-stepper
3. rowing machine
4. cross-country ski machine
5. an Airdyne (combines a stationary bicycle with arm levers)
6. stationary bike

*From: (Zeni AI, Hoffman MD, Clifford PS: Energy expenditure with indoor exercise machines. JAMA 1996;275:1424-1427)

It is generally accepted that exercise intensities in the range of approximately 60-90% of maximal heart rate or 50-85% of maximal oxygen uptake are appropriate for enhancement of health and cardio-respiratory fitness (consensus statements from the American College of Sports Medicine, NIH and Surgeon General's Report). These guidelines are provided for those who are interested in gaining and maintaining reasonable general health and fitness.

Do not take this to mean that the experts believe this is all it takes to be competitive in endurance sports. Nonetheless, it is clear that if the majority of our population would spend 30 minutes most days of the week performing exercise within these intensity guidelines, our society would be tremendously healthier and our expendi-

ture on health care would be significantly reduced.

Our work (Zeni AI, Hoffman MD, Clifford PS: Energy expenditure with indoor exercise machines. JAMA 1996;275:1424-1427) has demonstrated that the recommended exercise intensities can be achieved at relatively low levels of perceived effort. For instance, the minimal intensity guidelines were met at perceived efforts of "fairly light" when exercising on a treadmill, stair stepper, rowing machine and cross-country skiing simulator. Perceived efforts of "somewhat hard" were required to achieve the desired minimal intensity with a bicycle ergometer and Airdyne.

This means that many forms of exercise can be used to enhance health and cardio-respiratory fitness at intensities that do not feel especially hard. This should be good news for those people who are having trouble taking that first step into an exercise program, or those who think that they need to suffer to improve their health and fitness.

We should encourage everyone to exercise regularly and recognize that the exercise does not need to feel especially hard for it to have a beneficial effect on general health. ■

Dr. Hoffman is an endurance ultramarathoner, who is involved in research and medical practice. (This article was taken from an endurance list posting-by permission.)

(PROSTATE continued from page 1)

optimist.) Are there false positives in cancer screening, yes, as there are, in all cancer screening methods, for all cancers? That's why we have backup procedures (biopsies, ultrasound) to employ before rushing off to the OR to make a boat payment on someone's prostate; is impotence, and urinary leakage a serious issue? You bet it is, but there are expert surgeons out there, gifted operators at many medical centers, and you look for one of these to do nerve sparing prostate surgery—you ask for their complication rate, how many surgeries they do of this kind in a week, etc., or get to a major cancer treatment center where there are surgeons who specialize in this area.



Bottom line; I can't think of a single male doc over the age of 45 I know who doesn't get a yearly prostate cancer check-physical exam and PSA lab values. As always, you have to decide for yourself, and be willing to take the responsibility for the outcome. ■

This article was originally a post on the endurance on-line list. Gil Preston is a physician living in Butte, Montana. He is a climber, triathlete and is a member of the endurance on-line list.



■

■

WHAT ARE THE OPTIMAL HYDRATION LEVELS AND HOW DO I TELL?

by Dr. Gil Preston, MD

I agree with Steve Born; I can't think of a practical way to judge the state of hydration without a sample of urine to inspect for volume and color:

- #1-urine white-do all right;
- #2-urine yellow-kill a fellow (or gal).

If you are doing an 8 hour event and don't pass urine, you could be on the way to renal failure due to low blood volume caused by dehydration. If you pass more than a couple

of completely colorless urines, you may be washing out electrolytes, and possibly over-hydrated. If you pass more than one dark yellow urine, increase your intake of water until your urine loses most of its color.

These are very rough field guidelines, and I think Brian's suggestion of about 20oz/hr is about right in a cool environment. As the temperature climbs, individual heat management physiologic variables play an increasingly greater role, and the only field

practical way to judge would be the way you feel, and the volume and color of your urine.

Ok, this is not the "deepest" article ever, but it may help someone prevent the severe consequences of serious dehydration. ■

(From an endurance list post-by permission.) Dr. Preston is an endurance athlete currently in General Practice in Butte, Montana.

ounces fluids/hour, takes NO electrolyte supplements, drinks an energy drink or eats an athletic energy bar with simple sugars, and may be ingesting a supplement containing either ginseng or creatine monohydrate.

Electrolytes are depleted at a faster rate than sweat-fluids loss. Adding more water without the electrolytes dilutes electrolytes dramatically in the muscle environment. Adding simple sugar for refueling exercise demands raises the osmolality fluid levels of the stomach from acceptable body fluid levels ranging from 280-303 mOsm. to 600 mOsm., hindering absorption of both fluids and food fuels. Electrolytes control osmolality and absorption rate, but when they are either diluted or depleted, the body rebels with an open display of muscle spasms, cramping, or failure.

If the internal muscle environment is in systemic stress, by dilution or depletion, or both, suddenly exposing it to a decreased temperature gradient in water is enough to activate muscle fiber spasm, cramping, or failure.

The general origin of muscle cramps as defined by sport scientists in human performance laboratories is not well investigated and is therefore not well understood. Clinically, "Exercise-Associated-Muscle-Cramps" [EAMC] have several theoretical causes:

1. Inherited abnormalities of substrate metabolism ("Metabolic Theory"),
2. Abnormalities of fluid balance ("Dehydration Theory"),
3. Abnormalities of serum electrolyte concentrations ("Electrolyte Theory"),
4. And extreme environmental conditions from heat or cold ("Environmental Theory").

Any one of the above or a combination of each could stage the physiological environment for a muscle cramp.

Recent data from studies of runners [during EAMC] do not support a single hypothetical cause from #1-2-3-4 above. Electromyographic (EMG) data collected during these cramp episodes reveals baseline activity is increased (between spasms) and, reduction of baseline EMG activity correlates well with clinical recovery. During acute cramping, EMG activity is high. Passive stretching reduces EMG activity and the stimulus evoking cramp mechanism.

In animal studies, abnormal reflex activity

in the muscle spindle (increased exercise) and the Golgi tendon organ (decreased activity) has been observed in fatigued muscle. Schweltnus et al., (1997) have hypothesized that EAMC is caused by sustained abnormal spinal reflex activity which appears to be secondary to muscle fatigue.

"Local muscle fatigue is responsible for increased muscle spindle afferent and decreased Golgi tendon organ afferent activity. Sustained abnormal reflex activity would explain increased baseline EMG activity between bouts of cramping. Passive stretching invokes afferent activity from the Golgi tendon organ, thereby relieving the cramp and decreasing EMG activity."*

Yes, to slow down and/or stretch it out is already well-known to most of us, because that is what we are coerced to do for relief.

Field "Reports" from athletes who have remedied their tendency to cramp reveal constant attention to intense interval sessions, prolonged endurance training, periodic rest, a balanced diet, and fluid-electrolyte use before and during each exercise session. Elevation of metabolic enzymes, creatine phosphate, and ATP tissue stores may be the resultant post-training factor resolution for problematic exercise-induced muscle cramps.

Abnormal reflex activity of the muscle spindle may be avoided by subjecting the muscle to excessive stress from the predicted demand-environment in a competitive event. The other alternative is to reduce effort during the event so as to maintain EMG activity below that which may induce a pre-EAMC environment.

OVERVIEW OF THE CAUSES OF EXERCISE-INDUCED MUSCLE CRAMPING

A muscle cramp is a common, painful, physiological disturbance of skeletal muscle. Many athletes are regularly frustrated by an exercise-induced muscle cramp, yet the pathogenesis remains speculative with little scientific research on the subject. This has resulted in a perpetuation of myths as to the cause and treatment of it.

There is a need for scientifically based protocols for the management of athletes who suffer exercise-related muscle cramp. An in-depth review of the literature and the specific neurophysiology of a muscle cramp during endurance exercise needs to be both defined and reviewed.

CRAMPS ORIGINATE IN THE NERVOUS SYSTEM

Disturbances at various levels of the central and peripheral nervous system and skeletal muscle are likely to be involved in the mechanism of cramp and may explain the diverse range of conditions in which a cramp occurs.

The activity of the motor neuron is subject to a multitude of influences including peripheral receptor sensory input, spinal reflexes, inhibitory inter neurons in the spinal cord, synaptic and neurotransmitter modulation and descending CNS input. The muscle spindle and golgi organ proprioceptors are fundamental to the control of muscle length and tone and the maintenance of posture, shortened muscle length, intense exercise and exercise to fatigue, resulting in increased motor neuron activity and motor unit recruitment.

The relaxation phase of muscle contraction is prolonged in a fatigued muscle, raising the likelihood of fused summation of action potentials if motor neuron activity delivers a sustained high firing frequency. Treatment of cramp is directed at reducing muscle spindle and motor neuron activity by reflex inhibition and afferent stimulation.

There are no proven strategies for the prevention of exercise-induced muscle cramp but regular muscle stretching using post-isometric relaxation techniques, correction of muscle balance and posture, adequate conditioning for the activity, mental preparation for competition and avoiding provocative drugs may be beneficial. Other strategies such as incorporating plyometrics or eccentric muscle strengthening into training programs, maintaining adequate carbohydrate reserves during competition on treating myofascial trigger points are speculative and require investigation. (Bentley 1996)

FLUID AND ELECTROLYTE BALANCE MAY LOWER MUSCLE CRAMP INCIDENCE

Depletion of body water from sweating beyond 2 percent of body weight can significantly impair athletic performance through deficiencies in thermoregulatory and circulatory functions. Dehydration occurs when fluid loss exceeds intake, the degree being directly proportional to the amount of fluid loss. It is difficult for the endurance athlete to avoid a negative water balance, because it is both impractical and undesirable to attempt to replenish the

(continued on page 11)

WHY FOOD DETERIORATES

What retrogradation prevalent in food may to a lesser degree occur in supplements in a specific biochemistry environment. The major cause of deterioration and waste of stored foods and beverages is due to inherent chemical and enzymatic reactions within food structures and the biological actions produced by external microbial contaminants. Temperature governs the rate of all these reactions. Enzyme initiated spoilage is a result of carbohydrates, fats, and proteins hydrolyzing into substances that cause breakdown of protective cells or texture alterations: flavor, odor, and color changes; the transformation of starches into sugars, resulting in toughness; oxidation of ascorbic acid; and so on. It can occur where the food tissues have been wounded, desiccated or when the food reaches maturity, at which point enzymes initiate these deteriorative activities.

Simply speaking, chemical and enzymatic reaction breakdown protective tissues which lead to infection and further degradation by microorganisms. Microorganisms including bacteria, yeasts, and molds, also rely on enzymes within their systems to maintain life-support activities. When ideal conditions prevail, they grow and multiply to sufficient levels to cause disease or spoilage. Ideal conditions occur when nourishment in the form of proteins, carbohydrates, fats, vitamins, and minerals provided by the host food coupled with a warm, moist and a neutral to slightly acid environment occur. The metabolic activities of microbial contaminants result in the liberation of chemical substances that can cause changes in foods similar to initiated by food enzymes. Microorganisms can also release poisonous exotoxins which are toxic to humans.

Yeasts and molds are cold loving vegetative microorganisms. Yeasts thrive in foods with high sugar content. Yeast cultures are found in canned foods, fruits, juices, and syrups after several days of refrigerated storage. They are easily detected by a bubble or froth appearance. Taste and smell will identify yeast contamination, as an alcohol taste and odor will appear. Most yeast metabolize foods sugars, liberating bubbles of carbon dioxide and alcohol. Molds thrive in similar conditions and are responsible for product storage deterioration in juices, breads, pastries, and bruised fresh fruits and vegetables.

Microorganisms are carried into the refrigerator on produce, produce boxes and distributed throughout the refrigerator by air

circulation, condensation and dripping. In addition, spills that are not or properly cleaned up provide a continuous source of recontamination to incoming fresh, cooked, and leftover foods.

Fruits and vegetables are living dynamic organisms even after detachment from the mother plant. They continue the metabolic processes of respiration (the take up of oxygen, its distribution, utilization, and the oxidation of energy rich cellular organic substances such as starch, sugars, and organic acids to produce CO₂, H₂O, and heat energy).

They also continue to transpire (the process of water loss). Overly high temperatures during handling, transport, and refrigerated storage accelerate the rate of these metabolic processes and hasten ripening and aging. The result is an increase in the production of ETHYLENE (an aging hormone), and the depletion of nutrient reserves (carbohydrates and sugars) which fuel respiration and support plant cell wall tissues.

These tissues serve as a protective barrier against infection. Produce is usually covered with microorganisms. The breakdown of protective cell wall tissues occurring from either: mechanical damage, moisture loss from transpiration, internal tissue breakdown from depletion of supportive nutrients and/or the production of internal ethylene, independently or in combination, open the door in the form of a wound for these degrading microorganisms. The warmer and more humid the conditions, the greater the rate of their infection and exponential growth. It is impossible to eradicate these microorganisms for they are constantly being reintroduced into refrigerators.

Therefore, it is necessary to maintain an environment that is less favorable to the support of their growth and more conducive to maintaining the healthy integrity of protective cell wall tissues. It is best accomplished by maintaining low refrigeration temperatures and proper humidity control.

MEAT

The shelf life of meats is generally judged as quality attributes by consumers. They include qualities such as color, odor, flavor, tenderness, juiciness, nutritional quality, and safety. Changes that occur during storage include oxidation, spoilage by microorganisms, dehydration, and changes caused by natural enzymes. Bacterial spoil-

age is the major factor affecting shelf life. Most of the microorganisms that cause spoilage of meats are either present at the time of slaughter or are introduced during dressing, cooling and cutting in the processing rooms. Again, low refrigeration temperatures and proper humidity control are the best ways to control these organisms and preserve meat products.

REFRIGERATION FACTORS

Microorganisms are ubiquitous. They are constantly being reintroduced into your refrigerators by new food products, containers and personnel. It is virtually impossible and economically not feasible to maintain a microorganism free refrigerated storage environment. To maintain safe and economic food preservation it is imperative to control all of the environmental factors that enable these microorganisms the ability to infect, accelerate growth, and transfer to other food products.

TEMPERATURE

The most critical environmental factor in preserving the quality and extending the storage life of food products is the control of temperature. Temperature has an adverse affect on all perishable food products. The rate at which molecules move (increasing with heat) determines the rate at which they react with others or initiate chemical reactions. Therefore, the ambient (surrounding) temperatures are transferred into the food products increasing: the rate of respiration and ethylene production in living plant tissues (fruits and vegetables), as well as enzyme activity, transpiration, microbial respiration, and growth within all types of food products. Slowing these activities are best achieved by maintaining the lowest possible storage temperature without freezing the food product. One-two degrees above the freezing point of the specific food product is recommended. In smaller food service facilities, it is difficult to maintain optimum temperatures for different food groups, due to the limitations on the number of refrigerators available to isolate the food groups. ■

REFERENCE

Quoted by Permission:
Personal Post: to Dr. Bill Misner, Ph.D.
Date: Mon, 19 Apr 1999 14:03:04 -0700
From: Christopher Myers, President/Humitrol, Inc.: www.humitrol.com

Quoted by Permission:
"HUMIDITY PLAYS A LARGE PART IN THE SPREAD OF FOOD BORN ILLNESS."
Rear Admiral Joyce Johnson, US Coast Guard
Director of Health & Safety Food Service Refrigeration www.humitrol.com/refriger.htm

reported higher stress levels on the day they got "the real thing" by pill.

Studies on how coffee affects cardiovascular risk have come up with mixed findings, Lane says. The drink may not have a significant effect on light drinkers and those at low coronary risk. But cutting out caffeine could help some adults, particularly those vulnerable to heart attack or stroke.

"Caffeine may be a preventable coronary disease risk factor that could be eliminated," Lane says. About 80% of U.S. adults drink caffeinated coffee, national surveys show.

WHEN TO USE CAFFEINE?

1. The ideal is simply NEVER.
2. A distant second best is to use "them" not closer than a 4-hour window to workouts and macronutrient-micronutrient replenishment ingestion or post workout.
3. Last and least best is to use them inside the 4-hour window during, before, or after exercise, resulting in less than optimal performance.

4. **Conclusion:** Limit the caffeine, there are other supplements which are safe and work better for the "long run." ■

REFERENCES

- Int J Sport Nutr J; 1998; 8: 95-104. RESEARCH REVIEW OF Dr. Astrid Nehlig's Caffeine Study, French National Health and Medical Research Institute <http://onhealth.com/ch1/briefs>
- Quinlan P, Lane J, Aspinall L, Effects of hot tea, coffee and water ingestion on physiological responses and mood: the role of caffeine, water and beverage type, (Berl) 1997 Nov 134:2 164-73.
- Lane JD, Adcock RA, Williams RB, Kuhn CM; Caffeine effects on cardiovascular and neuroendocrine responses to acute psychosocial stress and their relationship to level of habitual caffeine consumption, Psychosom Med 1990 May-Jun 52:3 320-36.
- Lane JD, Manus DC; Persistent cardiovascular effects with repeated caffeine administration, Psychosom Med 1989 Jul-Aug 51:4 373-80.
- Lane JD, Phillips-Bute BG, Pieper CF; Caffeine raises blood pressure at work, Psychosom Med 1998 May-Jun 60:3 327-30.
- Phillips-Bute BG, Lane JD; Caffeine withdrawal symptoms following brief caffeine deprivation, Physiol Behav 1997 Dec 31 63:1 35-9.
- Lane JD; Neuroendocrine responses to caffeine in the work environment; Psychosom Med 1994 May-Jun 56:3 267-70.

Lane JD, Steege JF, Rupp SL, Kuhn CM; Menstrual cycle effects on caffeine elimination in the human female, Eur J Clin Pharmacol 1992 43:5 543-6.

Lane JD, Phillips-Bute BG; Caffeine deprivation affects vigilance performance and mood, Physiol Behav 1998 Aug 65:1 171-5.

Lane JD; Caffeine and cardiovascular responses to stress, Psychosom Med 1983 Oct 45:5 447-51.

Article @ <http://www.endureplus.com/dailynews.htm>

Golan R, Optimal Wellness, Ballantine Books, New York, 1995:171-180, 316.

Balch JF, Balch PA, Prescription For Nutritional Healing, Avery Publishing Group Inc., Garden City, NY, 1990: 75-76.

Mindell E, Safe Eating, Warner Books, New York, 1987:125-132.

Mindell E, Vitamin Bible, Warner Books, New York, 1991:247-249.

Misner, W.D., Nutrition For Endurance: Finding Another Gear, Dolezal & Associates Publishing, Livermore, Calif., 1998.



(MUSCLE CRAMPS continued from page 9)

amount lost in the course of an endurance event. A question often raised regarding athletic performance is whether electrolyte replacement is necessary during prolonged exercise. This article examines two of the electrolytes, sodium and potassium, in relation to athletic performance.

Several recent research studies, examining the influence of various exercise protocols on these two electrolytes, are reviewed. It appears that the need to replace sodium after ultra endurance events is more common than the need to replace potassium. Sodium replacement may prevent hyponatremia, a condition which can result in diarrhea, exhaustion, syncope, or convulsions. Hyponatremia, associated with potentially fatal complications, is a risk to the health of athletes participating in events such as the Iron man Triathlon. The body is well equipped to conserve fluids and electrolytes at times of stress.

The sweat glands and kidneys conserve electrolytes to minimize their losses when adapting to the heat; therefore, degree of acclimatization, fitness level, environmental conditions should all be considered when choosing a means of hydration. (Massad 1994) Of the cramping cases reported to me during the atypical hyperthermic racing season of 1998, water intake exceeded electrolyte intake total in

80% of these disappointing performance failures, likely resulting in "dilutional hyponatremia" [diluted sodium levels].

CRAMPING IS NOT ALWAYS CAUSED BY FLUID LOSS OR IMBALANCE BALANCE AND/OR ELECTROLYTE DEPLETION

Exercise-induced muscle cramp has been considered to result from disturbances of fluid and electrolyte balance resulting from excessive sweat loss. Serum biochemical and hematological measurements were made on 82 male marathon runners before and after a 42.2-km race.

Fifteen (18%) of the runners reported an attack of muscle cramp which occurred after 35 plus/minus 6 km (mean plus/minus s.d.) had been covered. These subjects were not different from the others in terms of racing performance or training status. Serum electrolyte concentrations, including sodium and potassium, were not different between those suffering from cramp and those not so affected either before or after the race, although a significant increase in serum sodium concentration occurred in both groups. Serum bicarbonate concentrations fell to the same extent (from 28 to 24 mmol l-1) in both groups.

Significant decreases in plasma volume, calculated from the changes in circulating

haemoglobin and hematocrit, occurred in both groups of subjects, but there was no difference in the extent of the hemoconcentration.

The results suggest that exercise-induced muscle cramp may not be always associated with gross disturbances of fluid and electrolyte balance. (Maughan 1986)

Of the athletes who reported reaching their goal-finish times during extreme heat-stress endurance events, the following characteristics also accompanied each of their reports:

1. Training acclimatization to heat at 70-75% VO2 Max Race Pace.
2. Progressive training to 66% of the distance within 6 weeks prior to event at the above race pace.
3. Complex Carbohydrate Energy Drink 300-450 calories/hour during event. [Sustained Energy or Hammer Gel or Both]
4. Fluid Intake less than 24 ounces per hour but more than 16 fluid ounces per hour.
5. Electrolyte intake with Endurolytes at the rate of 2-6 Endurolytes per hour.
6. Attempted to run first half of the event slower than race pace, while attempt-

(continued on page 12)

- ing to run the second half faster.
7. Attempted to sponge upper body* as often as possible all through the event. *[Some used an ice collar-ice in towel wrapped around the neck.]
 8. A few of these athletes planned 1-2 preventative stretch breaks when muscle areas began to spasm or cramp.
 9. All of these athletes used regular interval sessions in the heat of the day in order to elevate muscle tissue stores of glycogen, metabolic enzymes, ATP, and Creatine Phosphate.
 10. Each of these athletes reported employing a 7-10 day taper to the last 2-3 days prior to the event practiced by warming up and light-easy stretching. ■

REFERENCES

Schwellnus MP, Derman EW, Noakes TD, "Aetiology of skeletal muscle 'cramps' during exercise: a novel hypothesis," J SPORTS SCI, 1997 Jun, 15:3, 277-285.

Bentley, S., Exercise-induced muscle cramp: proposed mechanisms and management, Sports medicine 21(6), June 1996, 409-420.

Massad, S.J. Shire, N., Sodium and potassium needs of the athlete, Journal of the International Council for Health, Physical Education, Recreation, Sport, and Dance 31(1), Fall 1994, 18-23.

Maughan, R.J., Exercise-induced muscle cramp: a prospective biochemical study in marathon runners, Journal of sports sciences 4(1), Spring 1986, 31-34.

ENDURANCE NEWS MISSION STATEMENT

The objective of Endurance News is to provide you, the serious endurance athlete, with a valuable resource that you will find to be informative, educational, thought provoking and helpful in your ongoing pursuit of optimum performance and health.

Endurance News features insightful articles on diet, nutrition, training and other topics of interest to endurance athletes - Written by myself as well as professional and elite amateur athletes, and other experts in the area of nutrition and exercise. In addition, EN will include articles highlighting new and existing E-CAPS products and how to get the maximum benefits from them.

In reading this and future issues, please remember that the views expressed in this publication will always be biased in favor of a healthy diet, hard training that emphasizes quality over quantity, and prudent supplementation to improve health and performance. But above all, we at Endurance News believe there are no short cuts, and success can only come from hard work.

Brian Frank
Editor

Legal disclaimer: The contents of Endurance News are not intended to provide medical advice to individuals. For medical advice, please consult a licensed health care specialist. ■

ENDURANCE NEWS

P.O. Box 4010
Whitefish, MT 59937
1-800-336-1977
e-caps.com
hammernutrition.com

Bulk Rate
U.S. Postage
PAID
Whitefish, MT
Permit No. 14

IN THIS ISSUE:

- ✓ • SCREENING FOR PROSTATE CANCER
- ✓ • MUSCLE CRAMPS: ORIGINS & RESOLUTION
- ✓ • SHOULD SUPPLEMENTS BE REFRIGERATED?
- ✓ • CAFFEINE CONTROVERSY
- ✓ • EXERCISE MACHINES & CALORIC EXPENDITURE
- ✓ • OPTIMAL HYDRATION LEVELS
- ✓ • WHAT TYPE OF TRAINING SHOULD YOU DO NOW?
- ✓ • HOT SOFT GOODS
- ✓ • SUSTAINED ENERGY WARNING
- ✓ • HAMMER GEL UPDATE
- ✓ • THE ULTIMATE FUEL/ELECTROLYTE COMBINATION
- ✓ • FREE SHIPPING - REFER A FRIEND!